PHILOSOPHICAL TRANSACTIONS,

OF THE

ROYAL SOCIETY

OF

LONDON.

FOR THE YEAR MDCCXCIV.

PART II.

LONDON,

SOLD BY PETER ELMSLY,
PRINTER TO THE ROYAL SOCIETY.
MDCCXCIV.

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ERRATA.

Page 190 line 2 from bottom, note, *for* description, *read Discription.*
Page 192 line 2 from bottom, note, *dele L.* after *Indicar.*
Ibid. line last, *for* STATIUS, *read* TATIUS.

N. B. The pagination of sheet I i is wrong throughout in the hundreds; 141 being put for 241, and so on.

PHILOSOPHICAL TRANSACTIONS.

XII. *On the Conversion of Animal Muscle into a Substance much resembling Spermaceti.* *By* George Smith Gibbes, *B. A. of Magdalen College*, Oxford. *Communicated by* George Shaw, *M. D. F. R. S.*

Read March 13, 1794.

It is a matter of great curiosity to observe, after any fact has been well ascertained, how many things might have led to a much earlier investigation; particularly so, had the writings of many great men been equally examined, with those observations which, though apparently very trifling, have often excited general attention. The conversion of animal muscle into a fatty matter gives us a very striking example.

The celebrated Sir Thomas Brown, in his very learned and curious treatise intituled *Hydriotaphia*, assures us, that he has found a soap-like substance in an hydropical body. His words are as follow, viz. "In an hydropical body, ten years buried in "a church-yard, we met with a fat concretion, where the nitre

" of the earth, and the salt and lixivious liquor of the body,
" had coagulated large lumps of fat into the consistence of
" the hardest Castile soap; whereof part remaineth with us."

Lord BACON, in his work intituled *Sylva Sylvarum*, also mentions this curious circumstance: " You may turn (almost)
" all flesh into a fatty substance; if you take flesh and cut it
" into pieces, and put the pieces into a glass covered with
" parchment; and so let the glass stand six or seven hours in
" boiling water. It may be an experiment of profit for mak-
" ing grease or fat for many uses; but then it must be of such
" flesh as is not edible, as horses, dogs, bears, foxes, badgers,
" &c."

Animal muscle, having lost its living principle, has been generally supposed to undergo, when exposed either to the action of air or water, that kind of decomposition only which is known by the name of the putrefactive fermentation. Since the discovery of the bodies in the *Cimetière des Innocens* at Paris, this subject has been more attended to; and a substance much resembling spermaceti, is now known to be formed by combinations which take the animal flesh and water.

If you put flesh under water, and let it stay some time, it will get very offensive, and the putrefactive fermentation will in some measure most assuredly take place. This seems to have been the reason why the substance remaining in the water had not been more accurately examined, it being imagined that as this decomposition had commenced, the whole would be changed in the same manner. It would appear strange, if the same substance, exposed to the action of two such different bodies as air and water, should undergo precisely the same change. That they do not, has been lately proved by many

experiments, and that the putrefactive fermentation is not at all necessary in the formation of this fatty matter, I think some of the following experiments will shew.

After having seen some of the matter found in the *Cimetière des Innocens* at Paris, I concluded that in some situations the same kind of substance might be easily found; accordingly I examined some of the macerating tubs belonging to anatomical schools in town, and I found that in most of them the flesh was nearly changed into this kind of fat. By the indulgence of Dr. PEGGE, the anatomical professor in Oxford, I was permitted to examine the receptacle in which the bodies are deposited, after he has finished lecturing on them. This place is a hole dug in the ground to the depth of about 13 or 14 feet, and, to remove all offensive smell, a little stream is turned through it. I found, on first looking into it, that the flesh was quite white, and on drawing up the first piece, I found it changed in the manner before described. From this place I have procured at least 12 pound weight of a substance equal in every respect to spermaceti.

Having seen many specimens of different animals, which had been changed under somewhat different circumstances, that is, where some had been buried in dampish ground, some in wet ground, and some even in water itself, I began to suspect that I might bring about the same change in a shorter time, at least I might determine the time necessary for it: with this view a piece of the leanest part of a rump of beef was confined in a box full of holes, which being tied to a tree near a river, was suffered to float in it. On taking this up from time to time, I perceived that it gradually got whiter and whiter, and at the

end of a month it was perfectly to appearance changed to a mass of fatty matter. From some circumstances, I am induced to believe that it is sooner converted in running water than when it is perfectly at rest; for when this beef was exposed to the water in the river, a piece of mutton was placed in a reservoir of water, and I perceived, that though the mutton was exposed for a longer time than the beef, yet it was not so much changed.

Finding that this substance was so formed, and that I could procure large quantities of it, I tried some experiments to purify it; for this purpose I took several pieces of it and melted them, and I found, though they were brought into a closer union, yet the fœtid smell was as bad as before. After trying some unsuccessful experiments, it occurred to me that if I could add a substance to it which would unite with the offensive parts, and not with the fat, I might then get it pure; accordingly I poured some nitrous acid upon it, which immediately had the desired effect; a waxy smell was perceived, and on separating and melting it, I got it nearly pure. The nitrous acid turns it yellow, but by submitting it to the action of the oxygenated muriatic acid, I have got it quite white and pure. In the beginning of last June I buried a cow, in a place where, from the rising of a river to supply a mill twice a day, it was submitted to the action of running water. On taking this cow up in December, I found that where the water was constantly running over it, there it was changed into a fatty substance, but where the water which had acted on the meat could not pass off, there a very disagreeable smell was sensible, and the flesh was not so much changed. A piece of this cow, that was perfectly

lean, was stuck through with a stick, and fastened to the bottom of the river; this piece was perfectly changed into a fat matter, and had lost its offensive smell.

I have brought about this change in a much shorter time, in the following manner. I took three lean pieces of mutton and poured on them the three mineral acids, and I perceived that at the end of three days each was much altered; that in the nitrous acid was much softened, and on separating the acid from it, I found it to be exactly the same with that which I had before got from the water; that in the muriatic acid was not in that time so much altered; the vitriolic acid had turned the other black.

From these experiments, it appears to me that it is not at all necessary that the putrefactive fermentation should take place; on the contrary, that it takes away a great deal of the flesh which might serve for the formation of a greater quantity of this waxy substance.

The foregoing experiments may not appear new to every one, but as they are perfectly so to me, I take the liberty of offering them.

XIII. *Abstract of a Register of the Barometer, Thermometer, and Rain, at* Lyndon, *in* Rutland, 1793. *By* Thomas Barker, *Esq. Communicated by Sir* Joseph Banks, *Bart. P.R.S.*

Read March 27, 1794.

		Barometer.			Thermometer.						Rain.
					In the House.			Abroad.			
		Highest.	Lowest.	Mean.	High.	Low.	Mean.	High.	Low.	Mean.	Lyndon.
		Inches.	Inches.	Inches.	°	°	°	°	°	°	Inches.
Jan.	Morn.	30,02	28,50	29,56	43	33	37½	42	25½	35	1,913
	Aftern.				43½	34	38	46½	32½	38	
Feb.	Morn.	29,70	28,73	27	48	38	41½	51	29	37	1,073
	Aftern.				51½	39½	42½	52	38	44	
Mar.	Morn.	29,80	28,59	38	45	37	41½	44½	30	36	2,773
	Aftern.				46	37½	43	55	38	44½	
Apr.	Morn.	29,85	28,72	43	49	39	44	46	31	38	3,002
	Aftern.				51	41	45	60	35½	48	
May	Morn.	29,85	28,70	58	57	48	52	57½	41	48	0,452
	Aftern.				60	49	53	69	49½	58½	
June	Morn.	29,78	29,19	49	61	50	56	59½	48	54	0,423
	Aftern.				63	53	58	76½	55	66	
July	Morn.	29,80	29,21	58	71½	59	64	69	54	61½	0,776
	Aftern.				79½	60	67	89	64	75	
Aug.	Morn.	29,81	28,73	47	66½	57½	61	62	48½	56	2,609
	Aftern.				70	58	63	80	59	69	
Sep.	Morn.	29,96	28,90	51	60	50	55	58	41	49½	3,848
	Aftern.				61½	51	56½	71	47½	60½	
Oct.	Morn.	29,98	28,76	49	59½	45½	54	58	32	49½	1,266
	Aftern.				62½	46	55½	67	40	58	
Nov.	Morn.	29,91	28,61	34	50	43	46	48½	28	41	3,427
	Aftern.				51	43	46½	52½	40	45½	
Dec.	Morn.	29,91	28,26	26	50	36	43½	52½	26½	39½	1,351
	Aftern.				52	37	43½	53	31	42½	
July 5 to 18		29,80	29,27	29,62	71½	63	65	68½	61	64½	22,913
					79½	66	71	89	72½	80	

The winter was in general an open one; about a week's frost at the beginning of the year, the rains less than they had been, yet at times enough to keep it very dirty. The latter end of January, and the month of February were mild and fine, and the birds singing, but it was windy at times, and more so in March, which was a very uncertain month, being alternately windy, fine, wet, and at the end frosty; and the first of April there came a great snow, the only considerable one this winter, and was followed by floods for several days together, and a very backening season. This great snow and wet coming after a good deal of the spring corn was sown, was a damage to the crops; and the three following months being very dry, and just in the long days, the ground cracked and burnt very much, and many of the spring crops were very small, both for hay, straw, and corn; the wheat crop was the best, and that was pretty good.

The former part of the summer was cool, and sometimes cold, frequent frosty mornings, even into June; but July was hot and burning, and the fortnight from July 5 to 18 was uncommonly so; nine days out of twelve the thermometer was up to or above 80, and one day it was 89; this I think I never knew before, either for height or continuance, unless it was so in that hottest of summers 1750. This hot dry time hindered the sowing or coming up of turnips, which were late and dear this year. The hay, except on some moist meadows, was very light, but well gotten, as was also all the grain, but very dear, especially the spring corn.

This summer was complained of as dry, but it was so only the three months May, June, and July; there was only the quantity of one month's rain in those three months, and that

being just in the long days, in the high strong sun, and when all the crops should be in their greatest growth, they were much hurt by it, and perhaps the more so for having been before oversoaked with snow and wet. The latter part of the summer was very fine, rain enough to make the grass grow, and fine enough to get the crops in well; great eddishes, and more grass than there had been in any part of the summer before. And when in September and November there came two wet months, the cracks and dryness of the ground underneath carried it all clear off. The autumn also was remarkably fine, calm, mild, and almost without frost, so that the grass continued green till Christmas, which was very useful to the farmers, as it saved their fodder very much, which was very scarce.

XIV. *Observations on some* Egyptian *Mummies opened in* London. *By* John Frederick Blumenbach, *M. D. F. R. S. Addressed to Sir* Joseph Banks, *Bart. P. R. S.*

Read April 10, 1794.

AMONG the many instances of kindness I have experienced during my late abode in London, of which the recollection can never be obliterated from my memory, I reckon and acknowledge with gratitude, the uncommon, and to me very interesting, opportunities that were afforded me, to open and examine several Egyptian mummies.

A few days after my arrival, I found in the library of my honoured friend Dr. GARTHSHORE, F. R. S. among other Egyptian antiquities, a small mummy, not above one foot in length, of the usual form of a swathed puppet, wrapped up in cotton bandages, painted and gilt in its front part, and inserted in a small sarcophagus of sycamore wood, in which it fitted exactly.

Having expressed a wish to know the contents of this figure, the Doctor was kindly pleased to permit the opening of it; which accordingly took place on the 21st of January, 1792, at his house, in the presence of the President and several members of the Royal Society, and other men of letters.

The mummy itself measured $9\frac{1}{2}$ inches in length, and 8 inches in circumference at the breast, where it was of the greatest thickness.

The mask, exhibiting human features, was of a gypseous plaster, which here and there shewed some signs of having once been gilt.

Of the semicircular breast-plate, only some fragments were still extant.

The lower part of the front covering was, as is frequently observed on large mummies, in a manner dissected in regular compartments; and on it were painted the two standing figures that so often appear on the integuments of mummies, viz. on the right side, Anubis with the dog's head, and on the left, Osiris with the head of a sparrow-hawk.

The mummy itself was opened at the side. The outward integuments were glued so fast upon each other that it was found necessary to use a saw: the inner ones were less adhesive. I counted in the whole above 20 circumvolutions of these cotton bandages.

Within these was found, as a kind of nucleus, a bundle, about 8 inches long, and full 2 inches in circumference, of the integuments of a *larger* mummy, strongly impregnated with a resinous substance, which rendered it hard and compact, and which appeared on the edge to have been shaped into this oblong form by the paring of a knife. Pieces of this mass having been put on a heated poker, emitted a smell perfectly similar to that of fir-rosin, or the drug called *wild incense* from ant-hills.

The sarcophagus consisted of six small square boards of sycamore, fastened together with iron nails.

Soon after, I found in the collection of Dr. LETTSOM, F. R. S. another similar mummy, which, outwardly, perfectly resembled the above, was likewise contained in a sarcophagus, and differed

only in the dimensions, this being 14½ inches long, and 11½ in circumference at the breast.

The proprietor was likewise kind enough to suffer me to open it, which I did at his house on the 29th of January.

But much as it resembled Dr. GARTHSHORE's mummy externally, it was found very different as to its contents, there being in it a great number of detached bones of the skeleton of an *Ibis*, which were only here and there indued with rosin.

This striking difference, no doubt, rather excited than satisfied my curiosity; and having hereupon found in the British Museum no less than three such diminutive mummies, which were now to me become enigmatical, (viz. two in the HAMILTONIAN collection of antiquities, both contained in the same kind of square wooden coffins, clinched with iron nails, and the third in the SLOANIAN collection), I felt an irresistible impulse to apply to the President of the Royal Society, as one of the curators of the Museum, for his interference towards obtaining permission to open one of these three, in order to have an opportunity for some further comparison.

The result of this application was, that at the very next meeting of the curators leave was granted me, in the most liberal manner, not only to open one of these little mummies, but also to choose among the four large ones that are in that noble repository, the one that should appear to me the most likely to afford some material information on the subject.

I chose among the small ones the SLOANIAN, as it seemed to me to differ more than the two in the HAMILTONIAN collection, from either that of Dr. GARTHSHORE or Dr. LETTSOM. The four large mummies resembled in the main the one deposited in the academical museum of Gottingen, which I

examined in the summer of the year 1781. I selected, however, the one that appeared to differ most from the others, and from ours, by the very close adhesion of the bandages, from which I had reason to expect some difference in the interior preparation of it.

The 18th February was appointed for the opening of these two mummies at the Museum, in the presence of a numerous and respectable meeting.

The small mummy was externally very similar to those I had opened before, except that it was only $11\frac{6}{10}$ inches in length, and $8\frac{3}{10}$ inches round the breast, somewhat more compact in the handling, and, proportionably to its size, rather heavier.

On sawing it open, a resinous smell was immediately emitted, and glutinous particles of rosin adhered to the heated saw. This was owing to the cotton bandages having been from without impregnated with rosin, which was not the case with the two former ones.

On opening it completely, we found in the inside a human *os humeri*, being part of the mummy of a young person, perhaps eight years old, who had been embalmed with rosin; and with it were also found some shreds of the original integuments likewise impregnated with rosin. The upper end (*caput*) of the bone was inserted in the head, and the lower extremity was at the feet of the little figure.

Although when viewed externally nothing appeared suspicious in this little mummy, I found, however, on examining carefully the successive integuments, that the outward ones had some traces of our common *lint paper*, with which it seemed to have been *restored*, and afterwards painted over.

The large mummy I was permitted to examine, appeared by its stature to be that of a young person, not above 14 years old, but who had not, it seemed, as yet shed all his teeth. Its outward painted integuments were very similar to those of the Gottingen mummy, as it is figured in the IVth. Vol. of the *Commentationes Societatis Scientiarum.* The bandages about the head were in a manner caked together by means of rosin. The skull was inclosed in a kind of cast of the same substance, which could with difficulty be removed from it. It seemed also, to judge by its weight, to be filled with rosin, which particularly appeared in the cavity between the palate and the lower jaw. The rosin here having been gradually punched out, not the least appearance of a tongue was discernible; though some have asserted to have found traces of it in mummies; nor was any thing like the little golden plate (the supposed *naulus*) to be here met with. There were no remains whatever of the soft fleshy parts, of skin, tendons, &c.; in short, nothing was found but mere naked bones.

The *maxillæ* were sensibly prominent, but by no means so much as in a *true Guinea face*; and not more so than is often seen on handsome negroes, and not seldom on European countenances.

What appeared to me very remarkable, and has, as far as I can learn, never yet been noticed, is two exterior artificial ears, made of cotton cloth and rosin, and applied one on each side of the head. That on the right side was prominent; but the other seemed to have been shoved from its proper place; it was compressed, and much disfigured.

The cotton bandages on the remainder of the body were loose, not glued together, and readily yielded to the pressure of the hand.

The great cavity of the trunk was filled with bundled rags, and dark brown vegetable mould, in which, however, some pieces of rosin were here and there discovered. But the inside of the thoracic cavity on both sides of the spine, and the inner surface of the *ossa ilium*, were covered with a thick coat of rosin.

No idol, or any artificial symbol whatever, was found in the inside of this mummy. Nor did it contain any thing like an onion, such as have been now and then found about the parts of generation, or under one of the foot-soles of mummies.

The bones of the arms lay along the side of the body, in the same manner as those of the Gottingen mummy, and the one at Leipzig, described by KETTNER. Whereas in the mummy at Gotha, described by HERTZOG, the two at Breslau, that were examined by GRYPHIUS, another at Copenhagen, that was dissected by BRÜNNICH, and a fifth which belonged to the Royal Society, and has been described by Dr. HADLEY in the Philosophical Transactions, the arms were found lying across over the breast.

On some of the bones of the arms, for instance on the left *os humeri*, was found some glutinous rosin, which on being touched stained the fingers of a dusky red greasy colour, and had a strong empyreumatic alkaline taste. In the remainder of the body, the dry rosin was almost entirely covered or impregnated with a saline crust, by which the *thoracic vertebræ* in particular were much corroded, and which had entirely stripped the intermediate *corpora vertebrarum* of their *periosteum*.

Circumstances did not allow me to make any experiments on this salt; but I have since obtained from my worthy friend

JOHN HAWKINS, Esq. F. R. S. some considerable pieces of mummies which he had bought of a druggist at Constantinople, one of which was covered and impregnated with a saline incrustation, which in taste and appearance was very similar to that I have just now mentioned. Of this I dissolved a part in water, filtered and evaporated the solution, and thus obtained a true *soda*, or mineral alkali *(natrum)*, which shot into very neat and regular crystals. (See Tab. XVI. fig. 4.)

For the sake of comparison, I examined another large mummy in the Museum, which had already been opened in several places. This was of a full grown person, and measured 5 feet 5 inches in length. Like the former, it shewed not the least trace of any of the soft parts, but consisted of nothing but naked bones.

Except a little rosin which stuck fast between the teeth, this mummy, as far as its inside could be examined, contained none of that substance; its thoracic and abdominal cavities being entirely filled with a dark brown mould, which also occupied the whole space between the palate and the lower jaw, where it could easily be loosened and drawn out with the fingers.

The *maxillæ* of this mummy were still less prominent than those of the former one.

Some weeks after, viz. the 17th March, I had an opportunity to examine one more mummy at the Honourable CHARLES GREVILLE'S, F. R. S. which had four years before, viz. March 29, 1788, been already opened in the presence of several curious spectators. It belonged to JOHN SYMMONS, Esq. of Grosvenor house, Westminster, who with the most obliging readiness allowed me unconditionally, not only to dissect it as

much more as I should think proper, but also to select and take away whatever parts of it I should think worthy of a particular investigation.

It was a mummy of a child about six years old, which as to its preparation, (viz. without rosin, and without the least remaining trace of any of the soft parts), and the painted semicircular breast-plate, consisting of several folds of cotton cloth glued upon each other, was very similar to those at the British Museum, and the one at Gottingen, except that the characters upon that part of the cotton integument which covered the shanks, resembled rather more the figures of the one delineated by Count CAYLUS, in his *Recueil, &c.* Vol. V. Tab. XXVI—XXIX.

Nothing remained of the head but some pieces of the bones of the face, a few teeth, and the mask, which still adhered to the cotton bandages.

Among the teeth I found the *incisores*, which notwithstanding the tender age of the person had however a very short thick crown, considerably worn away at that edge which is usually sharp. This, therefore, is a new confirmation of the extraordinary phænomenon which I had already noticed in a complete skull, and some fragments of jaws, in my own collection,* and which had also been observed by MIDDLETON in the Cambridge mummy,† and by BRÜCKMANN in the one that is at Cassel.‡ STORR has also seen something similar in a mummy that is preserved at Stuttgard.§

* *Decas Craniorum*, I. Tab. I.

† MIDDLETON's Miscellaneous Works, Vol. IV. p. 170.

‡ BRUCKMANN's Account of this Mummy. Brunswick, 1782, 4to.

§ STORR, *Prodromus Methodi Mammalium.* Tubing. 1780, 4to. p. 24.

If we reflect during how many centuries, and through what a variety of revolutions, the Egyptians have used the practice of mummifying their dead bodies, it will naturally occur that we are not to expect in all mummies a similar characteristic formation of the teeth, any more than we are to look for a similar characteristic national form in their productions of art.

This peculiar structure of the teeth was not observed in the two mummies I examined in the British Museum, neither does it exist in our Gottingen mummy. A detached skull of a mummy in the Museum, prepared with rosin, and which bore great resemblance to the abovementioned in its general form, and especially in the narrowness of the poll, had unfortunately the crowns of the teeth so much mutilated as to afford no manner of information concerning this circumstance.

The above observation however appears, at all events, to be well worth attending to, as it may hereafter prove a criterion for determining the period at which any given mummy has been prepared.

But what interested me most in Mr. SYMMONS's mummy was the *mask*, to the two sides of which pieces of the bandages, with which the whole of the exterior integuments had been fastened to the corpse, still adhered. The inner part of this mask was sycamore wood, its outside being shaped, by means of a thick coat of plaster, in bas-relief, into the form of a face, the surface of which seemed to have been stained with natural colours, which time had now considerably blended and obscured. Having, however, with Mr. SYMMONS's leave, taken this mask, together with some other very interesting pieces of his mummy, with me to Gottingen, I there steeped it in warm water, and carefully separated all the parts of it. By this means

I discovered the various *fraudulent artifices* that had been practised in the construction of this mask: the wooden part was evidently a piece of the front of the sarcophagus of the mummy of a young person; and in order to convert its alto-relievo into the basso-relievo of the usual cotton mask of a mummy, plaster had been applied on each side of the nose; after which paper had been ingeniously pasted over the whole face, and lastly, this paper had been stained with the colours generally observed on mummies.

The small SLOANIAN mummy in the Museum had probably been prepared nearly in the same manner. That the deception has in both cases been very industriously executed, appears from this, that, as far as I can learn, no one has observed it before, although both these pieces have no doubt been often seen, and examined by persons conversant with these matters.

Some other suspicious circumstances in the mummies I examined in London were more evident. For instance, the coffins of sycamore wood fastened together with *iron* nails, in which the small mummies of Dr. GARTHSHORE, Dr. LETTSOM, and Sir W. HAMILTON, were contained, had most probably been recently constructed of pieces of decayed sarcophagi of ancient mummies. The little SLOANIAN mummy even lay in a box in the form of a sarcophagus, which was made of a dark-brown hard wood, totally different from the sycamore, and manifestly of modern construction.

How many other artificial restorations and deceptions may have been practised in the several mummies which have been brought into Europe, which have never been suspected, and may perhaps never be detected, may well be admitted, when we consider how imperfect we are as yet in our knowledge of

this branch of Egyptian archæology, which, as a specific problem, few have hitherto treated with the critical acumen it seems to deserve.

All the knowledge we have concerning the manner of preparing mummies is derived from two sources, viz. (*a*) the examination of the mummies themselves; and (*b*) two classical passages in HERODOTUS and DIODORUS SICULUS; STRABO and other ancient authors having mentioned mummies only incidentally, and in very few words.

But unfortunately these two classical passages do not in the least agree with the state of the mummies brought into Europe, which are in general of two sorts, viz. (*a*) the hard compact ones, wholly indued with rosin, which hence can be *knocked into pieces*; (*b*) the soft ones, which yield to the pressure of the hand, and are prepared with very little rosin, and often none at all, *whose loose bandages may be wound off*, and which contain in their cavities scarce any thing but a vegetable mould, and particularly no idol whatever as far as I have been able to learn.

The front part of the latter is usually covered with a painted, and, at times, gilt mask of cotton cloth; and as they appear more variegated than the former, and have no rosin in them yielding drugs for traffic, they are brought in much greater numbers, and may be seen in many collections in Europe in a more perfect state than the former, though often rendered so by restoration. The former, on the contrary, have for this very reason remained most of them in the hands of druggists.

Of this, viz. the former sort, were the two in the dispensary of CRUSIUS at Breslau, which GRYPHIUS described in the year

1662, and particularly the very valuable body of a mummy which was opened by the apothecary HERTZOG, at Gotha, in 1715, and in which more idols, beetles, frogs (as symbols of fertility), nilometers, &c. were found, than was ever, to the best of my knowledge, known to have been contained in any other mummy whatever.

But HERODOTUS, that very *inquisitive and credulous historian* (as one of the most learned and judicious antiquaries in England has named him), does not so much as mention either of these sorts of mummies; nor does he speak of the rosin, or painted masks, although he expressly describes such painted integuments on the Æthiopian mummies.

DIODORUS is equally silent as to the rosin, and the painted covering; whilst on the other hand he advances some very strange assertions, such as that the skill of the embalmers extended so far as perfectly to preserve the lineaments of the face, although the faces of mummies of both sorts be generally covered with cotton cloth to the thickness of nearly a man's hand.*

These authors, although they have both been in Egypt, had probably their intelligence merely from hearsay; for, on the other hand, it would no doubt be too paradoxical to assert, that all the mummies we are now acquainted with have been made since the days of DIODORUS, and that none of those described by him and by HERODOTUS should have reached our time. Count CAYLUS rather conjectures, that no mummies were made since the conquest of Egypt by the Romans (about the time of DIODORUS); but in this he is manifestly mistaken, since we learn from St. AUGUSTIN that so low down

* This had already been noticed by MIDDLETON, *l. c.*

as his own times (viz. in the first half of the fifth century) mummies were certainly made in Egypt.* But that among the mummies that now exist, especially the hard ones, which are entirely done over with rosin, there cannot but be many of a much greater antiquity, will, among other proofs, appear particularly from the style of workmanship of several of the little idols contained in them.

At least it may be admitted, without much hesitation, that the mummies we now possess, which differ so much in their preparation and characteristic structure, are at least of a period including one thousand years.

But it were much to be wished that we might have *certain criteria, to determine with some accuracy* the precise age of any particular mummy that may happen to fall into our hands. Before, however, we can expect to obtain this object, the two following *pia desideria* must first be accomplished, viz.

(A) A more accurate determination of the *various*, so strikingly *different*, and yet as strikingly *characteristic* national configurations in the monuments of the Egyptian arts, together with a determination of the periods in which those monuments were produced, and the causes of their remarkable differences.

(B) A very careful technical examination of the characteristic forms of the several *skulls* of mummies we have hitherto met with, together with an accurate comparison of those skulls with the monuments abovementioned.

This, at least, I consider as the surest method of solving the problem; being persuaded that, especially after what has just now been said of the fraudulent restorations, it can hardly be

* Augustin. Serm. 361. (Oper. T. V. p. 981.)

expected that we should be able to draw any just inferences from the mere style, and the contents of the painted integuments of the mummies we may have opportunities to examine.

Still less can we infer aught from the sculpture or paintings on the sarcophagi, as to the contents of the mummies sent us into Europe; MAILLET having about sixty or seventy years ago detected the fraud of the Arabs, who he says are in the practice of breaking in pieces the mummies contained in the catacombs in the more ornamented sarcophagi, for the sake of the idols they expect to find in them, of replacing them with tolerably preserved common painted mummies (such as I have called soft), and thus offering them for sale.

The osteological properties which I have had opportunities to observe in the skulls of mummies, are most of them mentioned in the description of my collection of the skulls of different nations above quoted; and will, I hope, prove useful to others for further comparisons.

As to the *different* national physiognomies of the ancient Egyptians, I shall here advert only to what, in my physiological study of the varieties in the human species, I have deduced from my comparisons of these skulls with the artificial monuments found in Egypt. For I am wholly at a loss to conceive how learned writers, not only of the stamp of the author of the *Recherches sur les Egyptiens*;* but even professional antiquaries, such as WINKELMANN,† and the author of the *Recherches sur l'Origine des Arts de la Grèce*‡ could ascribe to the artificial monuments found in Egypt *one common* cha-

* T. I. p. 237.

† In his description *des Pierres gravées de Stosch.* p. 10, and in other works of his.

‡ T. I. p. 300.

racter of national physiognomy, and define the same in a few lines in the most decided and peremptory manner.

It appears to me that we must adopt at least *three* principal varieties in the national physiognomy of the ancient Egyptians; which, like all the varieties in the human species, are no doubt often blended together, so as to produce various shades, but from which the *true*, if I may so call it, *ideal* archetype may however be distinguished, by unequivocal properties, to which the endless smaller deviations in individuals may, without any forced construction, be ultimately reduced.

These appear to me to be, 1. the Æthiopian cast; 2. the one approaching to the Hindoo; and, 3. the *mixed*, partaking in a manner of both the former.

The first is chiefly distinguished by the prominent *maxillæ*, turgid lips, broad flat nose, and protruding eye-balls, such as VOLNEY finds the *Copts* at present;* such, according to his description, and the best figures given by NORDEN, is the countenance of the Sphinx; such were, according to the well-known passage in HERODOTUS on the origin of the Colchians, even the Egyptians of his time; and thus hath LUCIAN likewise represented a young Egyptian at Rome.† (See Tab. XVI. fig. 1.)

The second, or the *Hindoo cast*, differs *toto cœlo* from the above, as we may convince ourselves by the inspection of other Egyptian monuments. It is characterized by a long slender nose, long and thin eyelids, which run upwards from the top of the nose towards the temples, ears placed high on the head,‡

* Both in his *Voyage en Syrie*, &c. T. I. p. 74; and the *Ruines, ou Méditations sur les Révolutions*, p. 336.

† *Navigium s. Vota*, c. 2. (Oper. T. III. p. 248.)

‡ The author of the *Recherches sur les Egyptiens* is pleased to consider this as a

a short and very thin bodily structure,* and very long shanks. As an *ideal* of this form, I shall only adduce the painted female figure upon the back of the sarcophagus of Capt. LETHIEULLIER'S mummy in the British Museum, which has been engraved by VERTUE, and which most strikingly agrees with the unequivocal national form of the Hindoos, which, especially in England, is so often to be seen upon Indian paintings. (See fig. 2.)

The third sort of Egyptian configuration is not similar to either of the preceding ones, but seems to partake something of both, which must have been owing to the modifications produced by local circumstances in a foreign climate. This is characterized by a peculiar turgid habit, flabby cheeks, a short chin, large prominent eyes, and rather a plump make in the person.† This, as may naturally be expected, is the structure most frequently to be met with. (See fig. 3.)

I thought this little digression the less intrusive, as it appears to me that it may on the one hand prove useful, not only towards illustrating the history of the origin and descent of the nations that were transplanted into Egypt, and have acquired the general denomination of Egyptians, but also for the determination of the different periods of the *style of the arts of the ancient Egyptians*, concerning which we have as yet very imperfect ideas; whilst, on *the other hand*, it might lead to much accurate information as to matter of fact, many very eminent authors having given the most *incongruous* representations of the Egyptian national character, such as WINKELMANN for

mere defect in the drawing; no doubt an excellent expedient this, to get rid of difficulties in the investigation of national varieties.

* Compare with this ARRIAN'S representation of the Indians, *Rer. Indicar. L.* p. 542.

† Compare ACHILLES STATIUS *Erotic.* L. iii. p. 177.

instance, who produced a wretched figure of a painted mask, without any character whatever, engraved in BEGER's *Thesaur. Brandenb.* T. III. p. 402, as one of the most characteristic representations of the form of the ancient Egyptians; and who, as well as several others, will have this form to be similar to that of the Chinese; an assertion which, after having had opportunities to compare twenty-one living Chinese at Amsterdam, and having since seen in London abundance of ancient Egyptian monuments, especially in the British Museum, and the collections of MR. TOWNLEY, Mr. KNIGHT, and the Marquis of LANDSDOWN, has ever appeared to me incomprehensible.

Adopting, as I think it conformable to nature, five races of the human species, viz. 1. the Caucasian; 2. the Mongolian; 3. the Malay; 4. the Ethiopian; 5. the American; I think the Egyptians will find their place between the Caucasian and the Ethiopian, but that they differ from none more than from the Mongolian, to which the Chinese belong.

Thus far concerning the bodies of the Egyptians prepared into mummies. I shall conclude with some observations on the probable meaning and destination of the diminutive mummies, which have given rise to the present inquiry.

They certainly are *not* what they have long, I believe, universally been taken for,* namely, mummies of small children and embryos. Some of them are the real mummies of Ibises, such as the one of Dr. LETTSOM, and one of the two in the HAMILTONIAN collection, in the British Museum, which had by decay been so far laid open as to allow me plainly to distinguish in it the bill of an Ibis, and other bones of a bird.

* See, for example, M. THR. BRÜNNICH's *Dyrenes Historie og Dyre-Samlingen, udi Universitetets Natur-Theater.* T. I. p. 2.

These sacred birds, it is well known, were usually, after having been swathed round with cotton bandages, placed in earthen urns, and deposited in the catacombs appropriated to the Ibises. Sometimes, without being stuck into an urn, they were prepared in the form of a puppet, yet so that the head and bill projected at the top; one of this sort has been figured by Count CAYLUS. And thirdly, the whole bird was frequently wrapped up in this puppet form, and dressed in a mask, like one of the human species.

But as the two others, viz. Dr. GARTHSHORE's and the SLOANIAN, were externally perfectly similar to the above-mentioned, I am led to conjecture (for in the total want of information from the ancients concerning these small mummies, we must however fix upon some conjecture), that the manufacturers of mummies, who made them for sale, in order to save themselves the trouble of preparing a bird, took a bone, or other solid part of a decayed mummy, or indeed any thing that was nearest at hand, dressed it up as the mummy of an Ibis, and tendered it for sale.

Whoever recollects what a despicable set the Egyptian priests were, even in the time of STRABO, and how the whole religious worship of the Egyptians was then already fallen into decay, will not think this conjecture too gratuitous, or void of probability.

Or shall we rather consider these puppets as the *memento mori* which it is well known the Egyptians were wont to introduce at table in their meals and festivals. HERODOTUS says, that little wooden images were usually carried about for this purpose, and I do actually recollect having seen such small wooden representations of mummies in the British Mu-

In C. Caylus's Recueil
T. VII. Pl. 9. Fig. 1.

Bronze.

Fig. 1.

Painted on the back of the Coffin
of Capt. Lethieullier's Mummy,
in the British Museum.

Fig. 2.

Belonging to Mr. Heyne, F.R.S.

White Marble.

Fig. 3.

Fig 1 & 3 are Idols of Isis with little Horus on her knees.

Fig. 4.

natural size

seum. LUCIAN also relates, as an eye witness, that in his time the dead bodies themselves were introduced at table. It is easy to conceive how, during the long interval of near 700 years, before the transition took place from the first simple idea to this disgusting practice, such little mummies may at some period or other have formed the intermediate step.

The author of the *Recherches sur les Egyptiens* seems unwilling to admit that real mummies had ever been introduced at table: but his scepticism appears to me to be no better founded than the contrary assertion of one of the most eminent physicians of the last century, CASP. HOFFMANN, who in his once classical work *de Medicamentis Officinalibus*, in the section of the Egyptian mummies, gravely relates, that in Lower Saxony no feast was ever given without the introduction of a mummy.* And strange as this *qui pro quo* between an Egyptian corpse and a particular kind of Brunswick strong beer must appear, it is however a fact, that several more modern writers upon mummies have actually copied it out into their works with implicit confidence.

* P, 642. "A Saxonibus audivi, nullum apud ipsos convivium transigi posse, sine "*mummei*, uti appellant. Ita olim sine lasere, et hodie Indi sine asa fœtida nihil co- "medunt. Hinc, qui in Ægyptum eunt afferre secum solent *talia cadavera*."

XV. *Observations on Vision.* By David Hosack, *M. D. Communicated by* George Pearson, *M. D. F. R. S.*

Read May 1, 1794.

By what power is the eye enabled to view objects distinctly at different distances? As the pupil is enlarged or diminished according to the greater or less quantity of light, and in a certain degree to the distance of the object, it would readily occur that these different changes of the pupil would account for the phænomena in question. Accordingly anatomists and philosophers, who have written upon this subject, have generally had recourse to this explanation.

Amusing myself with these changes of the pupil, as a matter of curiosity, by presenting to the eye different objects at different distances, I soon perceived that its contraction and dilatation were irregular and more limited than had been supposed; *i. e.* that approaching the object nearer the eye, within a certain distance, the pupil not only ceased to contract, but became again dilated; and that beyond a few yards distance, it also ceased to dilate: these circumstances immediately occurred as objections to the above explanation; for were it from the contraction and dilatation of the iris alone that we see objects at different distances, I naturally concluded it should operate regularly to produce its effects; but if to view an object at a few yards distance it be enlarged to the utmost

extent, surely it must of itself be insufficient to view one at the distance of several miles; for example, the heavenly bodies.

Another difficulty here presents itself: in viewing the sun, instead of dilating, according to the distance, it contracts, obeying rather the quantity or intensity of the light, than the distance of the object. Knowing no other obvious power in the eye itself of adapting it to the different distances of objects, it occurred to me to inquire, whether the combined action of the external muscles could not have this effect. I first proposed this query to an optician of eminence in London, and who has written expressly on this subject. I repeated the same question to a celebrated teacher of anatomy. Encouraged by their replies, I have since attended more particularly to the subject, and hope my inquiries have not been altogether unsuccessful. As introductory to a more distinct view of what I have to advance, it appears necessary to premise the following observations, relative to those general laws of vision which are more particularly connected with this part of the subject, and to which we shall have occasion of frequent reference.

1st. Let A B C, (Tab. XVII. fig. 1.) be an object placed before the double convex lens D E, at any distance greater than the radius of the sphere whereof the lens is a segment; the rays which issue from the different points of the object, and fall upon the lens, will be so bent by the refractive power of the glass as to be made to convene at as many other points behind the lens, and at the place of their concourse they will form an image or picture of the object. The distance of the image behind the glass varies in proportion to the distance of the

object before the glass; the image approaching as the object recedes, and receding as that approaches. For if we suppose, (fig. 2.), A and B two radiating points, from which the rays A C, A D, and B C, B D, fall upon the lens C D, it is manifest that the rays from the nearest point A diverge more than those from the more distant point B, the angle at A being greater than that of B;* consequently the rays from A, whose direction is A E and A F when they pass through the glass, must convene at some point (as G) more distant from the lens than the point H, where the less diverging rays B K and B L from the point B are made to convene; which may also be proved by experiment with the common convex glass.†

It will be necessary to have this proposition in view, as we shall afterwards have occasion to use it in shewing, that by varying the distance between the retina and the anterior part of the eye we are enabled to see objects at different distances.

2d. If an object, as A B, (fig. 3.) be placed at a proper distance before the eye (E), the rays which fall from the several points of the object falling upon the cornea pass through the pupil, and will be brought together by the refractive power of the different parts of the eye on as many corresponding points of the retina, and there paint the image of the object, in the same manner as the images of objects placed before a convex lens are painted upon the spectrum, placed at a proper distance behind it; thus the rays which flow from the point A are united on the retina at C, and those which proceed from B are collected at D, and the rays from all the intermediate points are convened at as many intermediate points of the

* EUCLID, Book I. Prop. 21.

† See KEPLER Diopt. Postul. SMITH's Optics, GRAVESANDE, &c.

retina; on this union of the rays at the retina depends distinct vision. But supposing the eye of a given form, should the point of union lie beyond the retina, as must be the case with those from the less distant object, agreeable to the preceding proposition; or should they be united before they arrive at the retina, as from the more distant object, it is evident that the picture at the retina must be extremely confused. Now as the rays which fall upon the eye from radiating points at different distances have different degrees of divergence, and the divergence of the rays increasing as the distance of the radiating point lessens, and, *vice versa*, lessening as that increases; again, as those rays which have greater degrees of divergence, viz. from the nearer objects, require a stronger refractive power to bring them together at a given distance than what is necessary to make those meet which diverge less, it is manifest, that to see objects distinctly at different distances, either the refractive power of the eye must be increased or diminished, or the distance between the iris and retina be varied, corresponding with the different distances of the objects; both of which probably take place, as will hereafter appear.*

Having then established these as our premises, we shall next examine the different principles which have been employed for explaining vision at different distances.

* "Facile enim intelligitur, quo longius radii adveniunt, eo magis esse parallelos; "eo minus ergo differre ab axi, et eo minoribus viribus corneæ et lentis crystallinæ in "focum cogi. Ut enim corpus magis distat, ita sub minori angulo radii adveniunt. "Contra si corpus conspicuum valde vicinum fuerit, radiorum ab eo advenientium an- "gulus est major, et adeo magis divergentes in oculum incidunt, et viribus egent refrin- "gentibus majoribus omnibus densioribus."—HALLER. Elem. Phys. lib. xvi.

Most writers upon this subject refer this power of the eye to the contraction and dilatation of the iris. Within certain limits this would, upon first examination, as already observed, appear to be the case, since the pupil enlarges as the object is further removed from the eye, and again contracts as it is brought near. The extent of this principle I have already pointed out; but I suspect we also err in attributing to the difference of distance what are only effects of different quantities of light, a circumstance in which it is the more easy to commit error as they are generally proportionate one to the other; *i. e.* as the object is near we require a less degree of light, and to exclude what is superfluous the iris contracts; but as it is more distant, a greater quantity of light becomes necessary, and the iris dilates: thus far we see the use of the enlargement or diminution of the pupil, as the object is more or less distant. But distinct vision does not consist in the quantity of light alone, though too much or too little would obscure the image.

It is also necessary that the rays which flow from the object should fall upon the retina in a certain direction, to form a distinct picture; but surely the greater or less quantity of light, the greater or less number of rays, which it is only the property of the iris to diminish or increase, cannot alter the direction.

But there is still another argument to prove, that the contraction or enlargement of the pupil is not of itself sufficient to produce distinct vision at different distances, viz. that the myopes, whose pupil contracts and dilates as in other eyes, are still unable to adapt the eye to different distances; and the means by which this is remedied certainly does not consist in

a larger or smaller aperture for the rays to pass through, but a power of altering their direction, which the change in the shape of the eye had rendered too convergent. The same fact is also observable in those who squint; the pupil in both eyes equally contracts and dilates, but still the vision of one eye is less perfect than the other. Another principle upon which it has been attempted to explain this power of the eye, is a supposed change in the convexity of the crystalline lens; the ancients had some obscure notion of it, but it has been lately pursued by Mr. THOMAS YOUNG, in a paper published in the Philosophical Transactions of London for 1793. He has endeavoured to demonstrate the existence of muscles in the crystalline lens, and by their action to account for distinct vision at different distances. This opinion deserves here the more particular examination, having met the attention of the Royal Society, and thereby likely to influence the general opinion upon this subject.

That we may not mistake the meaning of the author, I beg leave to premise his description of the structure of the lens. "The crystalline lens of the ox," he observes, "is an orbicular "convex transparent body, composed of a considerable number "of similar coats, of which the exterior closely adhere to the "interior; each of these coats consists of six muscles, inter- "mixed with a gelatinous substance, and attached to six mem- "branous tendons. Three of these tendons are anterior, "three posterior; their length is about two-thirds of the "semidiameter of their coat; their arrangement is that of "three equal and equidistant rays meeting in the axis of the "crystalline; one of the anterior is directed towards the "outer angle of the eye, and one of the posterior towards the

"inner angle; so that the posterior are placed opposite to the "middle of the interstices of the anterior, and planes passing "through each of the six, and through the axis, would mark "on either surface six regular equidistant rays. The muscu- "lar fibres arise from both sides of each tendon, they diverge "till they reach the greatest circumference of the coat, and "having passed it, they again converge till they are attached "respectively to the sides of the nearest tendons of the oppo- "site surface. The exterior or posterior portion of the six, "viewed together, exhibits the appearance of three penni- "formi-radiated muscles."

In the first place, to say nothing of the transparency of muscles, as an argument against their existence, we must unavoidably suppose, as they have *membranous tendons*, which Mr. YOUNG informs us he distinctly observed, that these tendons cannot possess the same degree of transparency and density with the bellies of these muscles; that is, they must possess some degree of opacity, or certainly he could not have pointed out their membranous structure, nor even the tendon itself, as distinct from the body of the muscle; and if they have not the same density, from their situation, and being of a penniform shape, must there not be some irregularity from the difference in the refraction of those rays which pass through the bellies of those muscles, and those again which pass through their membranous tendons? This structure then, of consequence, cannot be well adapted for a body whose regular shape and transparency are of so much consequence.

Again, Mr. YOUNG describes six muscles in each layer; but LEEUWENHOEK, whose authority he admits as accurate, relative to the muscularity of the lens, is certainly more to be attended to in his observation of bodies less minute, viz. as to

the layers themselves, in which these muscles are found, and which of course are larger, and more easily observed; but, with his accuracy of observation, he has computed, that there are near 2000 laminæ; and according to Mr. YOUNG, supposing each layer to contain six muscles, we have necessarily, in all, 12,000 muscles; the action of which certainly exceeds human comprehension. I hope this will not be deemed trifling minuteness, as it is a necessary and regular consequence, if we admit their existence as described.

But secondly, as to the existence of these muscles, I cannot avoid expressing a doubt. With the utmost accuracy I was capable of, and with the assistance of the *best* glasses, to my disappointment, I cannot bear witness to the same circumstances related by Mr. YOUNG, but found the lens perfectly transparent; at the same time, lest it might be attributed to the want of habit in looking through glasses, I beg leave to observe, that I have been accustomed to the use of them in the examination of the more minute objects of natural history. After failing with the glasses in the natural viscid state of the lens, I had recourse to another expedient; I exposed different lenses before the fire to a moderate degree of heat, by which they became opaque and dry; in this state it is easy to separate the layers described by Mr. YOUNG; but although not so numerous as noticed by the accurate LEEUWENHOEK, still they were too numerous to suppose each to have contained six muscles; for I could have shewn distinctly at least fifty layers, without the assistance of a glass, as was readily granted by those to whom I exhibited them.

But a circumstance which would seem to prove that these

layers possess no distinct muscles is, that in this opaque state they are not visible, but consist rather of an almost infinite number of concentric fibres (if the term be at all appropriate) not divided into particular bundles, but similar to as many of the finest hairs of equal thickness, arranged in similar order: see fig. 4, 5, and 6, where the arrangement of the layers and fibres has been painted from the real lens of an ox, and that without the assistance of a glass. To observe this fact, any person may try the experiment at pleasure, and witness the same with the naked eye, even separating many layers and their fibres with the point of a penknife.

This regular structure of layers, and those consisting of concentric fibres, is unquestionably better adapted for the transmission of the rays of light, than the irregular structure of muscles. It may, perhaps, be urged, that the heat to which I exposed the lens may have changed its structure: in answer to that I observe, it was moderate in degree, and regularly applied; of consequence we may presume, as it appeared uniformly opaque, that every part was alike acted upon; but by boiling the lens, where the heat is, without doubt, regularly applied, we observe the same structure.

Thirdly, that it is not from any changes of the lens, and that this is not the most essential organ in viewing objects at different distances, we may also infer from this undeniable fact, that we can, in a great degree, do without it; as after couching or extraction, by which operations all its parts must be destroyed, capsule, ciliary processes, muscles, &c.

Mr. YOUNG asserts, from the authority of Dr. PORTERFIELD, that patients, after the operation of couching, have not

the power of accommodating the eye to the different distances of objects; at present, I believe the contrary fact is almost universally asserted.*

Besides, if the other powers of the eye are insufficient to compensate for the loss of this dense medium, the lens, a glass of the same shape answers the purpose, and which certainly does not act by changing its figure. I grant their vision is not so perfect; but we have other circumstances upon which this can be more easily explained; which will be particularly noticed under the next head. It may not be improper also to observe, that the specific gravity of the crystalline compared with that of the vitreous humour, and of consequence, its density and power of refraction, is not so great as has been generally believed. Dr. BRYANT ROBINSON, by the hydrostatic balance, found it to be nearly as 11 to 10. I have also examined them with the instrument of Mr. SCHMEISSER, lately presented to the Royal Society, and found the same result; of consequence the crystalline lens is not so essentially necessary for vision as has been represented; especially as it is also probable, that upon removing it, the place which it occupied is again filled by the vitreous humour, whose power of refraction is nearly equal. At the same time we cannot suppose the lens an unnecessary organ in the eye, for nature produces

* "Et lente ob cataractam extracta vel deposita oculum tamen ad varias distantias "videre, ut in nobili viro video absque ullo experimento quo eam facultatem recupera- "verit. Etsi enim tunc ob diminutas vires quæ radios uniunt, æger lente vitrea opus "habet, eadem tamen lens in omni distantia sufficit."—HALLER, El. Phys.

"La lentille cristalline n'est cependant point de première necessité pour la vision. "Aujourd'hui, dans l'opération de la cataracte on l'enlève entièrement, et la vision "n'en souffre point."—DE LA METHERIE Vues Physiologiques. See also DE LA HIRE, HAMBERGER Physiolog.

nothing in vain; but that it is not of that indispensable importance, writers upon optics have taught us to believe.

Fourthly, Mr. YOUNG tells us, he has not yet had an opportunity of examining the human crystalline; and grants, that from the spherical form of it in the fish, such a change as he attributes to the lens in quadrupeds cannot take place in that class of animals. The lenses which I have examined in the manner abovementioned were the human, those of the ox, the sheep, the rabbit, and the fish, and in all the same lamellated structure is observable; even in the spherical lens of the fish these lamellæ are equally distinct, but without the smallest appearance of a muscle.

From these circumstances I cannot avoid the conclusion, that they do not exist; at the same time I am persuaded that Mr. YOUNG met with appearances which he supposed were muscles; but I am satisfied he will readily acknowledge, that the examination of the crystalline lens in its viscid glutinous state, is not only attended with much difficulty, but that the smallest change of circumstances might lead to error; which I apprehend may, probably, have been the case in that instance.

Upon examining it after boiling, or exposing it to a gradual degree of heat before the fire, when it may be handled with freedom, he will readily observe (without a glass) the numerous lamellæ, and the arrangement of their fibres, which I have described.

Another opinion has been sanctioned by many respectable writers, of the effects of the ciliary processes in changing the shape and situation of the lens; some supposed it to possess the power of changing the figure of the crystalline, rendering

it more or less convex ;* others, that it removed it nearer to the cornea ;† and others, that it removed it nearer the retina.‡

The advocates for these different opinions all agree in attributing these effects to a supposed muscularity of the ciliary processes.

Of the structure of these processes HALLER observes, "In "omni certe animalium genere processus ciliares absque ulla "musculosa sunt fabrica, mere vasculosi vasculis serpentinis "percursi molli facti membrana." Which structure, I believe, at present is universally admitted. But even supposing them muscular, such is their delicacy of structure, their attachment, and direction, that we cannot possibly conceive them adequate to the effects ascribed to them. Beside, what we observed of the muscles of the lens itself, also applies to the processes, viz. that they may be destroyed, as in couching or extraction, and yet the eye be capable of adapting itself to the different distances of objects. For a more full refutation of these opinions, see HALLER's large work.

The Situation, Structure, and Action of the external Muscles.§

Upon carefully removing the eyelids, with their muscles, we are presented with the muscles of the eye itself, which are six in number; four called recti, or straight; and two oblique;

* DES CARTES, SCHEINERUS, BIDLOUS, MOLLINETTUS, SANCTORIUS, JURIN.

† KEPLER, ZINN, PORTERFIELD.

‡ LA CHARIERE, PERRAULT, HARTSOEKER, BRISSEAU, and DERHAM.

§ For the accuracy of the representation I have annexed (in Tab. XVIII.) I can vouch, having been at much pains in the dissection; from which I had the painting taken by a most accurate hand, Mr. S. EDWARDS, a gentleman well known for his abilities in the plates of that admirable work, the Flora Londinensis.

so named from their direction, (see Tab. XVIII. fig. 1.) A A A A, the tendons of the recti muscles, where they are inserted into the sclerotic coat, at the anterior part of the eye. B, the superior oblique, or trochlearis, as sometimes called, from its passing through the loop or pulley connected to the lower angle of the orbiter notch in the os frontis; it passes under the superior rectus muscle, and backwards to the posterior part of the eye, where it is inserted by a broad flat tendon into the sclerotic coat. C, the inferior oblique, arising tendinous from the edge of the orbiter process of the superior maxillary bone, passes strong and fleshy over the inferior rectus, and backwards under the abductor to the posterior part of the eye, where it is also inserted by a broad flat tendon into the sclerotic coat. D D D, the fat in which the eye is lodged. In fig. 2. we have removed the bones forming the external side of the orbit, with a portion of the fat, by which we have a distinct view of the abductor. A B C, three of the recti muscles, arising from the back part of the orbit, passing strong, broad, and fleshy over the ball of the eye, and inserted by flat, broad tendons into the sclerotic coat, at its anterior part. D, the tendon of the superior oblique muscle. E, the inferior oblique, fig. 3. A, the abductor of the eye. B, the fleshy belly of the superior oblique, arising strong, tendinous, and fleshy from the back part of the orbit. C, the optic nerve. D and E, the recti muscles.

The use ascribed to these different muscles, is that of changing the direction of the eye, to turn it upwards, downwards, laterally, or in any of the intermediate directions, accommodated either to the different situation of objects, or to express the different passions of the mind, for which they are

peculiarly adapted. But is it inconsistent with the general laws of nature, or even with the animal œconomy, that from their combination they should have a different action, and thus an additional use? To illustrate this we need only witness the action of almost any set of muscles in the body; for example, in lifting a weight, the combined action of the muscles of the arm, shoulder, and chest, is different from the individual action of either set, or of any individual muscle; or an instance nearer our purpose may be adduced, viz the actions of the muscles of the chest and belly, making a compression upon the viscera, as in the discharge of urine, fœces, &c. But to question this fact would be to question the influence of the will in any one of the almost infinite variety of motions in the human body.

I presume, therefore, it will be admitted that we have the same power over these muscles of the eye as of others, and I believe we are no less sensible of their combined action; for example, after viewing an object at the distance of half a mile, if we direct our attention to an object but ten feet distance, every person must be sensible of some exertion; and if our attention be continued but for a short time, a degree of uneasiness and even pain in the ball of the eye is experienced; if again we view an object within the focal distance, *i. e.* within six or seven inches, such is the intensity of the pain that the exertion can be continued but a very short time, and we again relieve it by looking at the more distant objects; this, I believe, must be the experience of every person, whose eyes are in the natural and healthy state, and accordingly has been observed by almost every writer upon optics.

But the power of this combination, even from analogy,

appears too obvious to need further illustration. I shall therefore next endeavour to point out their precise action.

Supposing the eye in its horizontal natural position; I see an object distinctly at the distance of six feet, the picture of the object falls exactly upon the retina; I now direct my attention to an object at the distance of six inches, as nearly as possible in the same line; although the rays from the first object still fall upon my eye, while viewing the second, it does not form a distinct picture on the retina, although at the same distance as before, which shews that the eye has undergone some change; for while I was viewing the first object I did not see the second distinctly, although in the same line: and now, *vice versa*, I see the second distinctly, and not the first; the rays from the first, therefore, as they still fall upon the eye, must either meet before or behind the retina; but we have shewn that the rays from the more distant object convene sooner than those from the less distant object, therefore the picture of the object at six feet falls before, while the other forms a distinct image upon the retina; but as my eye is still in the same place as at first, the retina has by some means or other been removed to a greater distance from the fore part of the eye to receive the picture of the nearer object, agreeable to the principle page 198. From which it is evident, that to see the less distant object either the retina should be removed to a greater distance, or the refracting power of the media should be increased: but I hope we have shewn that the lens, which is the greatest refracting medium, has no power of changing itself. Let us next inquire, if the external muscles, the only remaining power the eye possesses, are capable of producing those changes. With respect to the

anterior part of the eye, we have seen the situation of those muscles; the recti strong, broad, and flat, arising from the back part of the orbit, passing over the ball as over a pulley, and inserted by broad flat tendons at the anterior part of the eye; the oblique inserted toward the posterior part, also by broad flat tendons; when they act jointly, the eye being in its horizontal position, it is obvious, as every muscle in action contracts itself, the four recti by their combination must necessarily make a compression upon the different parts of the eye, and thus elongate its axis, while the oblique muscles serve to keep the eye in its proper direction and situation. For my own part, I have no more difficulty in conceiving of this combination of those muscles than I have at present of the different flexors of my fingers in holding my pen. But other corresponding effects are also produced by this action; not only the distance between the anterior and posterior parts of the eye is increased, but of consequence the convexity of the cornea, from its great elasticity, is also increased, and that in proportion to the degree of pressure, by which the rays of light passing through it are thence necessarily more converged. But another effect, and one not inconsiderable, is, that by this elongation of the eye, the media, viz. the aqueous, crystalline, and vitreous humours through which the rays pass, are also lengthened, of consequence their powers of refraction are proportionably increased; all which correspond with the general principle. It may however be said, that as the four recti muscles are larger and stronger than the two oblique, the action of the former would overcome that of the latter, and thus draw back the whole globe of the eye; but does not the fat at the posterior part of the orbit also afford a resistance

to the too great action of the recti muscles, especially as it is of a firm consistence, and the eye rests immediately upon it? Admitting then that this is the operation of the external muscles when in a state of contraction, it is also to be observed, we have the same power of relaxing them, in proportion to the greater distance of the object, until we arrive at the utmost extent of indolent vision.

But, as a further testimony of what has been advanced, I had recourse to the following experiment, which will shew that the eye is easily compressible, and that the effects produced correspond with the principles I have endeavoured to illustrate.

With the common *speculum oculi* I made a very moderate degree of pressure upon my eye, while directing my attention to an object at the distance of about twenty yards; I saw it distinctly, as also the different intermediate objects; but endeavouring to look beyond it, every thing appeared confused. I then increased the pressure considerably, in consequence of which I was enabled to see objects distinctly at a much nearer than the natural focal distance; for example, I held before my eye, at the distance of about two inches, a printed book; in the natural state of the eye I could neither distinguish the lines nor letters; but upon making pressure with the speculum I was enabled to distinguish both lines and letters of the book with ease.

Such then I conceive to be the action and effects of the external muscles, and which I apprehend will also apply in explaining many other phænomena of vision; some of those it will not be improper at present briefly to notice.

First, may not the action of those muscles have more or less effect in producing the changes of vision which take place

in the different periods of life? At the same time the original conformation of the eye, the diminution of its humours, and, probably, of the quantity of fat upon which the eye is lodged, are also to be taken into the account. But the external muscles becoming irregular and debilitated by old age, in common with every other muscle of the body, are not only incapable of compensating for these losses, but cannot even perform their wonted action, and thus necessarily have considerable influence in impairing vision. Again, does not the habit of long sight so remarkable in sailors and sportsmen, who are much accustomed to view objects at a great distance, and that of short sight, as of watchmakers, seal-cutters, &c. admit of an easy solution upon this principle? as we know of no part of the body so susceptible of an habitual action as the muscular fibre.

Secondly. How are we to account for the weaker action of one eye in the case of squinting? That this is the fact has been well ascertained; Dr. REID * upon this subject observes, that he has examined above twenty persons that squinted, and found in all of them a defect in the sight of one eye. PORTERFIELD and JURIN have made the same observation.

The distorted position of the eye has, I believe, been generally attributed to the external muscles; but no satisfactory reason has ever been given why the eye, directed towards an object, does not see it distinctly at the same distance as with the other. The state of the iris here cannot explain it, as it contracts and dilates in common with the other; nor can we suppose any muscles the lens might possess could have any

* See his Inquiry into the Human Mind, page 322.

effect, as they are not at all connected with the nature of this disease.

But the action of the external muscles, I apprehend, will afford us a satisfactory explanation. When the eye is turned from its natural direction, for example, towards the inner canthus, it is obvious that the *adductor* muscle is shortened, and its antagonist, the *abductor*, lengthened; consequently, as the abductor has not the same power of contracting itself with the adductor, when the eye is directed towards an object, their power of action being different and irregular, the compression made upon the eye and its humours must also be equally irregular, and therefore insufficient to produce the regular changes in the refraction and shape of the eye we have shewn to be necessary in adapting it to the different distances of objects. The effects produced by making a partial pressure upon the eye with the finger, or *speculum oculi*, before noticed, would also appear to favour this explanation.

Thirdly. May it not in part be owing to the loss of this combined action of the external muscles, and the difficulty of recovering it, that the operation of couching is sometimes unsuccessful, especially when the cataract has been of long standing? This cannot be attributed to the iris, for it, perhaps, dilates and contracts as before: nor to the muscles of the lens, for they are removed; nor to the state of the nerve, for it is still sensible to light; and yet the patient cannot see objects distinctly; and it is not an uncommon circumstance, even when the operation succeeds, that the sight is slowly and gradually recovered. Instances have occurred, Mr. BELL*

* See his System of Surgery.

observes, of the sight becoming gradually better for several months after the operation.

When we have been long out of the habit of combining our muscles in almost any one action of life, as walking, dancing, or playing upon a musical instrument, we in a great measure lose the combination, and find a difficulty in recovering it, in proportion to the length of time we had been deprived of it; but the individual action of each muscle remains as before. Thus, probably, with the muscles of the eye. A variety of facts of a similar nature must present themselves to every person conversant in the science of optics, which may admit of a similar explanation.

I have thus endeavoured, first, to point out the limited action of the iris, and of consequence the insufficiency of this action for explaining vision. Secondly, to prove that the lens possesses no power of changing its form to the different distances of objects. Thirdly, that to see objects at different distances, corresponding changes of distance should be produced between the retina and the anterior part of the eye, as also in the refracting powers of the media through which the rays of light are to pass. And, fourthly, that the combined action of the external muscles is not only capable of producing these effects, but that from their situation and structure they are also peculiarly adapted to produce them.

Is it not then consistent with every principle in the œconomy of nature and of philosophy, seeing the imperfections of the principles which have hitherto been employed in explaining the phænomena in question, to adopt the one before us, until (agreeable to one of the established rules in philosophizing)

other phænomena occur, by which it may be rendered either more general, or liable to objections?

I have now finished what was proposed. I have declined entering into an extensive view of the structure of the eye, or any of the general principles of optics, as those subjects have been more ably treated in the works already cited, and thus would certainly have destroyed every claim to attention, which these few pages in their present form may possibly possess; and if I should be so fortunate as to succeed in establishing the principle I have proposed, for explaining the phænomena dependent upon this more important organ of our body (if any part possesses a pre-eminence in nature), I also hope it may, in abler hands, admit of some practical application, in alleviating the diseases to which its delicate organization so particularly exposes it.*

* Since the above pages have been written, I have found, upon consulting some of the earliest writers, that the effects of the external muscles did not altogether escape their attention; at the same time they had no distinct idea of their action: I must therefore disclaim the originality of the thought, although I had never met with it before the circumstances already noticed, of the insufficiency of the iris, had suggested it. If, however, I have succeeded in pointing out the precise action of those muscles, and its application to the general principles of vision, in which, I believe, I have never been anticipated, it will be the height of my wishes.

Fig. 1.

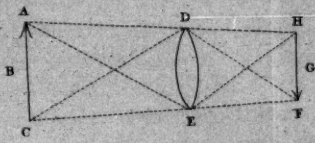


Fig. 2.

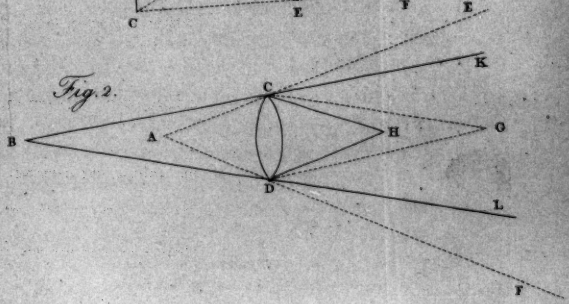


Fig. 3.

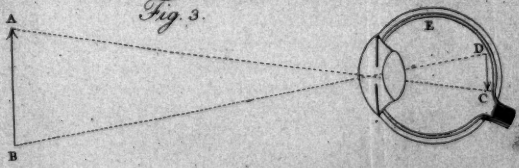


Fig. 4.

Fig. 5.

Fig. 6.

Fig. 1.

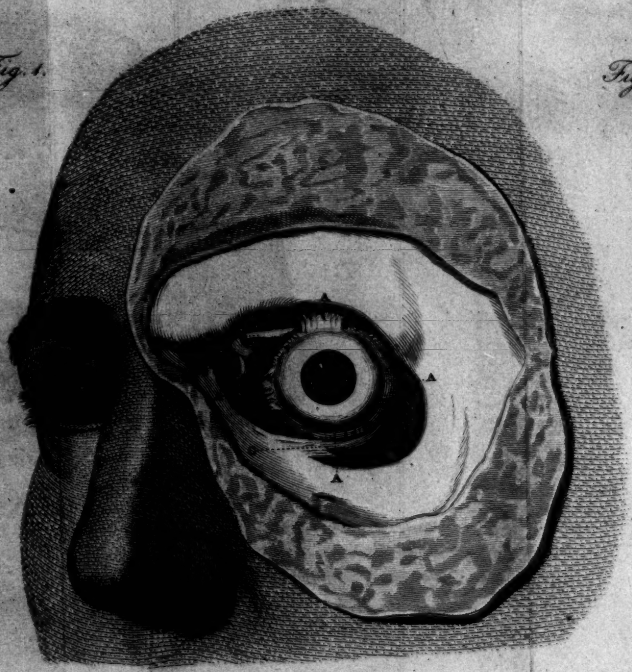


Fig. 2.

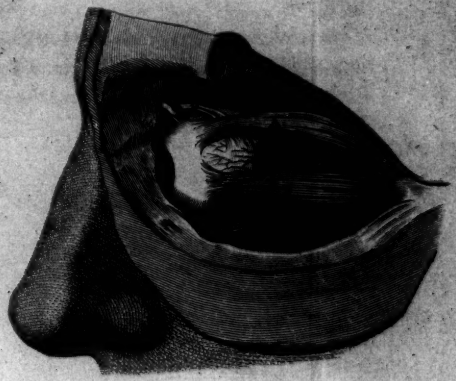
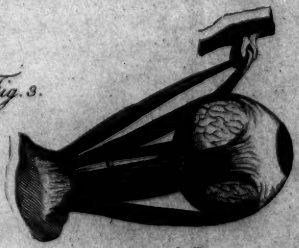


Fig. 3.



XVI. *Dr. Halley's Quadrature of the Circle improved: being a Transformation of his Series for that Purpose to others which converge by the Powers of* 80. *By the Rev.* John Hellins, *Vicar of* Potter's Pury, *in* Northamptonshire. *Communicated by* Nevil Maskelyne, *D.D. F.R.S. and Astronomer Royal.*

Read May 15, 1794.

1. Dr. Halley's method of computing the ratio of the diameter of the circle to its circumference was considered by himself, and other learned mathematicians, as the easiest the problem admits of. And although, in the course of a century, much easier methods have been discovered, still a celebrated mathematician of our own times has expressed an opinion, that no other aliquot part of the circumference of a circle can be so easily computed by means of its tangent as that which was chosen by Dr. Halley, viz. the arch of 30 degrees. This opinion, whether it be just or not, I shall not now inquire; my present design being to show, how the series by which Dr. Halley computed the ratio of the diameter to the circumference of the circle, may be transformed into others of swifter convergency, and which, on account of the successive powers of $\frac{1}{10}$ which occur in them, admit of an easy summation.

2. This transformation is obtained by means of different forms in which the fluents of some fluxions may be expressed.

To proceed with the greater clearness, I will here set down the fluxion in a general form, and its fluent, in the two series which are used in the following particular instance, and may be applied with advantage in similar cases.

3. The fluent of $\frac{x^{m-1}\dot{x}}{1-x^n}$ is $= \frac{x^m}{m} + \frac{x^{m+n}}{m+n} + \frac{x^{m+2n}}{m+2n} + \frac{x^{m+3n}}{m+3n}$, &c. which series, being of the simplest form which the fluent seems to admit, was first discovered, and probably is the most generally useful. But it has also been found, that the fluent of the same fluxion may be expressed in series of other forms, which, though less simple than that above written, yet have their particular advantages. Amongst those other forms of series which the fluent admits of, that which suits my present purpose is $\frac{x^m}{m.\,1-x^n} - \frac{n\,x^{m+n}}{m.\,m+n.\,1-x^n|^2} + \frac{n.\,2n.\,x^{m+2n}}{m.\,m+n.\,m+2n.\,1-x^n|^3} - \frac{n.\,2n.\,3n.\,x^{m+3n}}{m.\,m+n.\,m+2n.\,m+3n.\,1-x^n|^4} +$ &c. which, to say nothing of other methods, may easily be investigated by the rule given in page 64 of the third edition of EMERSON's Fluxions; or its equality with the former series may be proved by algebra.

4. On account of the sign — before x^n, in the last series, it may be proper to remark, that its convergency by a geometrical progression, will not cease till $\frac{x^n}{1-x^n}$ becomes $= 1$, or x becomes $= \sqrt[n]{\frac{1}{2}}$; and that, when x is a small quantity, and n a large number, this series will converge almost as swiftly as the former. For instance, if x be $= \sqrt{\frac{1}{3}}$, and $n = 8$, which are the values in the following case, the former series will converge by the quantity $x^n = \sqrt{\frac{1}{3}}|^8 = \frac{1}{81}$, and this series by the quantity $\frac{x^n}{1-x^n} = \frac{\frac{1}{81}}{1-\frac{1}{81}} = \frac{1}{80}$; where the difference in convergency will be but little, and the divisions by 80 easier than those by 81.

5. With respect to the indices m and n, as they are here supposed to be affirmative whole numbers, and will be so in the use I am about to make of them, the reader need not be detained with any observations on the cases in which these fluents will fail, when the indices have contrary signs.

6. It may be proper further to remark, that by putting $\frac{x^n}{1-x^n} = z$, and calling the first, second, third, &c. terms of the series $\frac{x^m}{m.\,1-x^n} - \frac{n.\,x^{m+n}}{m.\,m+n.\,1-x^n} + \frac{n.\,2n\,x^{m+2n}}{m.\,m+n.\,m+2n.\,1-x^n} + \&c.$ A, B, C, &c. respectively, the series will be expressed in the concise and elegant notation of Sir Isaac Newton; viz. $\frac{x^m}{m.\,1-x^n} - \frac{nz\,A}{m+n} + \frac{2nz\,B}{m+2n} - \frac{3nz\,C}{m+3n} + \&c.$ which is well adapted to arithmetical calculation.

7. I come now to the transformation proposed, which will appear very easy, as soon as the common series, expressing the length of an arch in terms of its tangent, is properly arranged.

If the radius of a circle be 1, and the tangent of an arch of it be called t, it is well known that the length of that arch will be $= t - \frac{t^3}{3} + \frac{t^5}{5} - \frac{t^7}{7} + \frac{t^9}{9} - \frac{t^{11}}{11} + \&c.$ Now, if the affirmative terms of this series be written in one line, and the negative ones in another, the arch will be

$$= \begin{cases} t + \frac{t^5}{5} + \frac{t^9}{9} + \frac{t^{13}}{13} + \frac{t^{17}}{17} + \&c. \\ -\frac{t^3}{3} - \frac{t^7}{7} - \frac{t^{11}}{11} - \frac{t^{15}}{15} - \frac{t^{19}}{19} - \&c. \end{cases}$$

And if, again, the first, third, fifth, &c. term of each of these series be written in one line, and the second, fourth, sixth, &c. in another, the same arch will be expressed thus:

$$= \begin{cases} + \begin{cases} t + \frac{t^9}{9} + \frac{t^{17}}{17} + \frac{t^{25}}{25} + \frac{t^{33}}{33} + \&c. \\ \frac{t^5}{5} + \frac{t^{13}}{13} + \frac{t^{21}}{21} + \frac{t^{29}}{29} + \frac{t^{37}}{37} + \&c. \end{cases} \\ - \begin{cases} \frac{t^3}{3} + \frac{t^{11}}{11} + \frac{t^{19}}{19} + \frac{t^{27}}{27} + \frac{t^{35}}{35} + \&c. \\ \frac{t^7}{7} + \frac{t^{15}}{15} + \frac{t^{23}}{23} + \frac{t^{31}}{31} + \frac{t^{39}}{39} + \&c. \end{cases} \end{cases}$$

All which series are evidently of the first form in article 3, and therefore their values may be expressed in the second form there given, or more neatly in the NEWTONIAN notation mentioned in art. 6. In each of these series the value of n is 8; and the value of m, $\begin{cases} \text{in the first series, is } 1; \\ \text{in the second series, is } 5; \\ \text{in the third series, is } 3; \\ \text{in the fourth series, is } 7. \end{cases}$

If now we take $t = \sqrt{\frac{1}{3}}$, the tangent of 30°, which was chosen by Dr. HALLEY, we shall have the arch of 30°

$$= \begin{cases} + \begin{cases} \frac{1}{\sqrt{3}} \times : 1 + \frac{1}{9.81} + \frac{1}{17.81^2} + \frac{1}{25.81^3} + \frac{1}{33.81^4}, \&c. \\ \frac{1}{9\sqrt{3}} \times : \frac{1}{3} + \frac{1}{13.81} + \frac{1}{21.81^2} + \frac{1}{29.81^3} + \frac{1}{37.81^4}, \&c. \end{cases} \\ - \begin{cases} \frac{1}{3\sqrt{3}} \times : \frac{1}{3} + \frac{1}{11.81} + \frac{1}{19.81^2} + \frac{1}{27.81^3} + \frac{1}{35.81^4}, \&c. \\ \frac{1}{27\sqrt{3}} \times : \frac{1}{7} + \frac{1}{15.81} + \frac{1}{23.81^2} + \frac{1}{31.81^3} + \frac{1}{39.81^4}, \&c. \end{cases} \end{cases}$$

Six times this quantity will be = the semicircumference when radius is 1, and = the whole circumference when the diameter is 1. If therefore we multiply the last series by 6, and write $\sqrt{12}$ for $\frac{6}{\sqrt{3}}$, and express their value in the form given in art. 6, we shall have the circumference of a circle whose diameter is 1,

$$= \left\{ \begin{array}{l} + \left\{ \begin{array}{l} \frac{81\sqrt{12}}{80} - \frac{8\,A}{9.80} + \frac{16\,B}{17.80} - \frac{24\,C}{25.80} + \frac{32\,D}{33.80}, \text{ \&c.} \\ \frac{81\sqrt{12}}{5.9.80} - \frac{8\,A}{13.80} + \frac{16\,B}{21.80} - \frac{24\,C}{29.80} + \frac{32\,D}{37.80}, \text{ \&c.} \end{array} \right. \\ - \left\{ \begin{array}{l} \frac{81\sqrt{12}}{3.3.80} - \frac{8\,A}{11.80} + \frac{16\,B}{19.80} - \frac{24\,C}{27.80} + \frac{32\,D}{35.80}, \text{ \&c.} \\ \frac{81\sqrt{12}}{7.27.80} - \frac{8\,A}{15.80} + \frac{16\,B}{23.80} - \frac{24\,C}{31.80} + \frac{32\,D}{39.80}, \text{ \&c.} \end{array} \right. \end{array} \right.$$

8. All these new series, it is evident, converge somewhat swifter than by the powers of 80. For in the first series, which has the slowest convergency, the coefficients $\frac{8}{9}, \frac{16}{17}, \frac{24}{25}$, &c. are each of them less than 1; so that its convergency is somewhat swifter than by the powers of 80.

9. But another advantage of these new series is, that the numerator and denominator of every term except the first, in each of them, is divisible by 8; in consequence of which the arithmetical operation by them is much facilitated, the division by 80 being exchanged for a division by 10, which is no more than removing the decimal point. These series then, when the factors which are common to both numerators and denominators are expunged, will stand as below, (each of which still converging somewhat quicker than by the powers of 80), and we shall have the circumference of a circle whose diameter is 1,

$$= \left\{ \begin{array}{l} + \left\{ \begin{array}{l} \frac{81\sqrt{12}}{80} - \frac{A}{9.10} + \frac{2\,B}{17.10} - \frac{3\,C}{25.10} + \frac{4\,D}{33.10}, \text{ \&c.} \\ \frac{9\sqrt{12}}{400} - \frac{A}{13.10} + \frac{2\,B}{21.10} - \frac{3\,C}{29.10} + \frac{4\,D}{37.10}, \text{ \&c.} \end{array} \right. \\ - \left\{ \begin{array}{l} \frac{9\sqrt{12}}{80} - \frac{A}{11.10} + \frac{2\,B}{19.10} - \frac{3\,C}{27.10} + \frac{4\,D}{35.10}, \text{ \&c.} \\ \frac{3\sqrt{12}}{7.80} - \frac{A}{15.10} + \frac{2\,B}{23.10} - \frac{3\,C}{31.10} + \frac{4\,D}{39.10}, \text{ \&c.} \end{array} \right. \end{array} \right.$$

By which series the arithmetical computation will be much more easy than by the original series.

April 30, 1794. J. HELLINS.

XVII. *On the Method of determining, from the real Probabilities of Life, the Values of contingent Reversions, in which Three Lives are involved in the Survivorship.* *By* William Morgan, *Esq. F. R. S.*

Read May 15, 1794.

In the last paper which I communicated to the Royal Society on the doctrine of survivorships, I concluded with observing that, as far as my own judgment could discover, I had then given rules for determining the values of reversions depending upon three lives in every case which admitted of an exact solution, and that the remaining cases, which were nearly equal in number to those I had already investigated, involved a contingency for which it appeared very difficult to find such a general expression as should not render the rules too complicated and laborious. Since that period I have bestowed much time and attention on this subject, and have at length so far succeeded as to give me reason now to hope that it is capable of being entirely exhausted. It is not my present design to enter into the investigation of all the problems which still remain to be solved. I shall here confine myself to a few of the most important, reserving the conclusion of the subject for some future opportunity.

The contingency to which I have alluded in this and my former paper, as opposing the great difficulty in those problems which I have not yet solved, is that of *one life's failing*

after another in a given time. It becomes necessary, therefore, previous to any other investigation, to deduce a general method of ascertaining such an event, and for this purpose I shall subjoin the following lemma.

LEMMA.

To determine, from any table of observations, the probability that B the elder dies *after* A the younger of two lives, either in any given number of years, or during the whole continuance of the life of B.

SOLUTION.

This event can take place in the first year only by the extinction of both lives, A having died first; the probability of which will be expressed by the fraction $\frac{\overline{b-m}\cdot a'}{2ab}$.* In the second year the probability will be increased; for the event may have taken place, as above mentioned, in the first year, or the lives may have failed in the second year, A having died first; or B may have died in this year, and A in the first year. The expression, therefore, for the second year will be $\frac{\overline{b-m}\cdot a'}{2ab}+\frac{\overline{m-n}\cdot a'}{2ab}+\frac{\overline{m-n}\cdot a'}{ab}=\frac{1}{ab}\times\frac{\overline{b-n}\cdot a'}{2}+\frac{\overline{m-n}\cdot\overline{a'+a'}}{2}$. In the third year the probability will be still further increased; for, in addition to the foregoing contingencies, the event may have taken place by the extinction of the two lives in the third year, A having died first; or by the extinction of the life of A

* In order to avoid unnecessary repetitions, I have uniformly in this paper preserved the same symbols as in my last paper.—See Phil. Trans. Vol. LXXXI. page 247.

in the first or second years, and of the life of B in the third year. Therefore, the probability for the third year will be expressed by $\frac{\overline{b-m}.a'}{2ab} + \frac{\overline{m-n}.a''}{2ab} + \frac{\overline{m-n}.a'}{ab} + \frac{\overline{n-o}.a'''}{2ab} + \frac{\overline{n-o}.\overline{a'+a''}}{ab} = \frac{1}{ab} \times \frac{\overline{b-o}.a'}{2} + \frac{\overline{m-o}.\overline{a'+a''}}{2} + \frac{\overline{n-o}.\overline{a''+a'''}}{2}$. By proceeding in the same manner for the fourth year, the probability will be found $= \frac{1}{ab} \times \frac{\overline{b-p}.a'}{2} + \frac{\overline{m-p}.\overline{a'+a''}}{2} + \frac{\overline{n-p}.\overline{a''+a'''}}{2} + \frac{\overline{o-p}.\overline{a'''+a''''}}{2}$; and supposing x to denote the difference between the ages of B, and of the oldest person in the table, and y and z respectively the number of persons living at the two last ages in the same table, the whole probability of the elder life's dying after the younger will be $= \frac{1}{2ab}$ into $\overline{b-z}.a' + \overline{m-z}.\overline{a'+a''} + \overline{n-z}.\overline{a''+a'''} + \overline{o-z}.\overline{a'''+a''''} \ldots + \overline{y-z}.\overline{a^{x-1}+a^x}$. Now, since it is well known that the probability of both lives failing in x years, without any regard to the order of their extinction, is $= \frac{\overline{b-z} \times \overline{a'+a''+a'''+a''''} \ldots + a^x}{ab}$ (or supposing π to be the number of persons living at the end of x years from the age of A) $= \frac{\overline{b-z}.\overline{a-\pi}}{ab}$, it is evident that, if the foregoing series be subtracted from this fraction, the probability will be obtained of the younger person's dying after the elder in x years. In the first paper which I communicated to the Royal Society on this subject,* I not only described the most concise method of computing a table of the probabilities of survivorship between any two given lives, but computed a comprehensive one for persons of all ages, whose common difference was not less than ten years. As the contingency in this lemma is of considerable

* See Phil. Trans. Vol. LXXVIII. p. 335.

importance, and the solutions of a great number of problems require that it should be previously ascertained, I have computed a similar table on the present occasion; and it will appear from the following operations that both are formed in nearly the same manner.

Ages of B.	A	Probability of B's dying after A.		Probability of A's dying after B.	
*95	85	$\frac{1}{4\times186}\times\frac{41\times3}{2}=$	.0827	$\frac{3\times41}{4\times186}=.0827=.0827$	
94	84	$\frac{1}{9\times234}\times\frac{48\times8}{2}+\frac{48+41\times3}{2}=$	.1546	$\frac{8\times89}{9\times234}=.1546=.1835$	
93	83	$\frac{1}{16\times289}\times\frac{55\times15}{2}+\frac{55+48\times8}{2}+\frac{48+41\times3}{2}=$	.2072	$\frac{15\times144}{16\times289}=.2072=.2599$	
92	82	$\frac{1}{24\times346}\times\frac{57\times23}{2}+\frac{57+55\times15}{2}+\frac{55+48\times8}{2}+\frac{48+41\times3}{2}=$	.2422	$\frac{23\times201}{24\times346}=.2422=.3145$	
91	81	$\frac{1}{34\times406}\times\frac{60\times33}{2}+\frac{60+57\times23}{2}+\frac{57+55\times15}{2}+$ &c. $=$	.2696	$\frac{33\times261}{34\times406}=.2696=.3544$	
90	80	$\frac{1}{46\times469}\times\frac{63\times45}{2}+\frac{63+60\times33}{2}+\frac{60+57\times23}{2}+$ &c. $=$	.2864	$\frac{45\times314}{46\times469}=.2864=.3894$	
89	79	$\frac{1}{62\times534}\times\frac{65\times61}{2}+\frac{65+63\times45}{2}+\frac{63+60\times33}{2}+$ &c. $=$	.2907	$\frac{61\times389}{62\times534}=.2907=.4260$	

From these specimens it will be readily seen, that the probability between two younger lives is derived from that of the two preceding older ones, without any addition of labour; for the sum of all the terms of the series, excepting the two first, is constantly obtained from the foregoing operations. Thus, when the ages of B and A are 92 and 82, the two terms $\frac{55+48\times8}{2}+\frac{48+41\times3}{2}$ form a part of the preceding series, which expresses the probability between two persons aged 93 and 83.

* This, and all the other computations in this paper, are deduced from the Northampton Table, in Dr. PRICE's Treatise on Annuities, Vol. II. p. 36. edit. 5th.

And in like manner when their ages are 91 and 81, the three terms $\frac{57+55\times 15}{2}+$ &c. form a part of the series which denotes the probability between two persons, aged 92 and 82. By proceeding with these operations, a table may be formed for all lives, whose common difference of age is the same, with little more trouble than in the single case of the two youngest lives. If a table of the probabilities of survivorship be already formed (such as that to which I have referred in my first paper), the operations in the present case may be exceedingly abridged; and it will not perhaps be improper here to explain the manner in which this is effected. By exchanging the symbols *c*, *d*, *e*, &c. in the solution in my first paper, for their equals *m*, *n*, *o*, &c. in the present solution, the series expressing the probability of B's surviving A will become $=\frac{1}{ab}\times\overline{\frac{b\,.\,a'}{2}+\frac{m\,.\,\overline{a'+a''}}{2}+\frac{n\,.\,\overline{a''+a'''}}{2}\ldots\ldots+\frac{z\,.\,a^{x}}{2}}$, which exceeds the series expressing the probability of B's dying after A by $\frac{z}{ab}\times\overline{a'+a''+a'''\ldots\ldots+\frac{a^{x}}{2}}$ (or supposing z, as in the Northampton Table, to be $=1$) by $\frac{a-\pi}{ab}$ nearly. If, therefore, the given probability of B's surviving A be denoted by Y, the probability of B's dying after A will be $=Y-\frac{a-\pi}{ab}$, and the probability of A's dying after B will be $=\frac{a-\pi}{a}-Y$. The following table has been computed in this manner, excepting the first and the two last divisions, where the difference of age between the two lives is 10, 80, and 90 years. In these cases, the probabilities have been deduced from the series in this lemma, and chiefly with the view of proving the accuracy of the table in my first paper. It is

however necessary to observe, that in the abovementioned series $\frac{x}{ab} \times \overline{a' + a'' + a''' + \ldots\ldots \frac{a^x}{2}}$, the last term, $\left(\frac{a^x}{2}\right)$ by supposing the whole series $= \frac{a-x}{ab}$, is taken $= a^x$, and therefore the difference between Y and the probability of B's dying after A, is not *exactly* expressed above. Regard has been had to this circumstance in the following table, in all cases where the age of the eldest life exceeds 86 years. But under that age it is omitted, as the expression $\frac{a-x}{ab}$ becomes then true to four places of decimals, and of consequence sufficiently correct for any useful purpose.

TABLE,

Shewing the probability of one life's dying after another.*

Ten years difference.			Twenty years difference.			Thirty years difference.			Forty years difference.		
Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.
1 11	.3973	.5858	1 21	.3885	.5244	1 31	.3384	.4821	1 41	.2908	.4355
2 12	.4664	.5136	2 22	.4536	.4431	2 32	.3934	.3934	2 42	.3355	.3396
3 13	.4962	.4822	3 23	.4803	.4086	3 33	.4155	.3555	3 43	.3526	.2983
4 14	.5176	.4597	4 24	.4934	.3898	4 34	.4307	.3284	4 44	.3642	.2686
5 15	.5297	.4469	5 25	.5028	.3767	5 35	.4382	.3133	5 45	.3694	.2518
6 16	.5417	.4342	6 26	.5120	.3638	6 36	.4456	.2983	6 46	.3746	.2351
7 17	.5501	.4252	7 27	.5183	.3546	7 37	.4498	.2881	7 47	.3777	.2228
8 18	.5559	.4190	8 28	.5223	.3482	8 38	.4533	.2796	8 48	.3791	.2138
9 19	.5586	.4159	9 29	.5237	.3450	9 39	.4541	.2751	9 49	.3788	.2084
10 20	.5591	.4152	10 30	.5232	.3439	10 40	.4532	.2731	10 50	.3772	.2057
11 21	.5583	.4157	11 31	.5223	.3438	11 41	.4516	.2722	11 51	.3747	.2043
12 22	.5571	.4167	12 32	.5209	.3440	12 42	.4497	.2716	12 52	.3719	.2033
13 23	.5558	.4178	13 33	.5187	.3449	13 43	.4476	.2712	13 53	.3690	.2024
14 24	.5544	.4189	14 34	.5179	.3445	14 44	.4453	.2709	14 54	.3659	.2016
15 25	.5530	.4201	15 35	.5162	.3449	15 45	.4430	.2706	15 55	.3626	.2009
16 26	.5513	.4215	16 36	.5144	.3454	16 46	.4405	.2704	16 56	.3591	.2003
17 27	.5500	.4225	17 37	.5128	.3456	17 47	.4381	.2699	17 57	.3551	.1994
18 28	.5490	.4232	18 38	.5117	.3452	18 48	.4360	.2688	18 58	.3523	.1978
19 29	.5486	.4233	19 39	.5109	.3442	19 49	.4342	.2670	19 59	.3491	.1956
20 30	.5485	.4230	20 40	.5105	.3427	20 50	.4325	.2648	20 60	.3459	.1928
21 31	.5490	.4221	21 41	.5105	.3406	21 51	.4312	.2618	21 61	.3428	.1893
22 32	.5498	.4209	22 42	.5107	.3382	22 52	.4298	.2586	22 62	.3399	.1852
23 33	.5506	.4196	23 43	.5110	.3356	23 53	.4284	.2553	23 63	.3244	.1809
24 34	.5515	.4183	24 44	.5110	.3332	24 54	.4268	.2519	24 64	.3339	.1765
25 35	.5524	.4169	25 45	.5112	.3306	25 55	.4253	.2484	25 65	.3307	.1719
26 36	.5533	.4155	26 46	.5112	.3280	26 56	.4235	.2449	26 66	.3274	.1673
27 37	.5543	.4140	27 47	.5113	.3253	27 57	.4212	.2413	27 67	.3238	.1626
28 38	.5553	.4125	28 48	.5114	.3225	28 58	.4199	.2376	28 68	.3201	.1578

* In the table in the LXXVIIIth Vol. of the Philosophical Transactions, the *certainty* of one life's surviving the other is denoted by 100. In this table the *certainty* of both lives becoming extinct is denoted by unity, this number being better suited to the solution in the following problems. It may not be improper to add, that both tables, though deduced from the decrements of life at Northampton, may be safely used, even when the values of the life annuities are derived from a different source, as the probabilities they express are very nearly the same, from whatever table of observations they are computed.

Ten years difference.			Twenty years difference.			Thirty years difference.			Forty years difference.		
Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.
29 39	.5562	.4110	29 49	.5115	.3196	29 59	.4179	.2338	29 69	.3164	.1528
30 40	.5573	.4094	30 50	.5115	.3167	30 60	.4159	.2299	30 70	.3122	.1479
31 41	.5583	.4078	31 51	.5112	.3140	31 61	.4136	.2260	31 71	.3077	.1430
32 42	.5592	.4063	32 52	.5108	.3113	32 62	.4112	.2220	32 72	.3029	.1380
33 43	.5601	.4048	33 53	.5104	.3085	33 63	.4089	.2177	33 73	.2977	.1331
34 44	.5608	.4034	34 54	.5099	.3057	34 64	.4066	.2134	34 74	.2921	.1282
35 45	.5613	.4022	35 55	.5092	.3029	35 65	.4037	.2089	35 75	.2858	.1237
36 46	.5625	.4003	36 56	.5086	.3000	36 66	.4009	.2043	36 76	.2788	.1194
37 47	.5635	.3986	37 57	.5072	.2969	37 67	.3978	.1997	37 77	.2715	.1150
38 48	.5646	.3968	38 58	.5071	.2939	38 68	.3945	.1950	38 78	.2637	.1106
39 49	.5655	.3951	39 59	.5051	.2909	39 69	.3910	.1902	39 79	.2559	.1057
40 50	.5664	.3934	40 60	.5049	.2878	40 70	.3872	.1854	40 80	.2470	.1014
41 51	.5669	.3920	41 61	.5038	.2845	41 71	.3829	.1805	41 81	.2384	.0960
42 52	.5676	.3904	42 62	.5026	.2810	42 72	.3785	.1753	42 82	.2280	.0910
43 53	.5684	.3886	43 63	.5017	.2770	43 73	.3736	.1699	43 83	.2174	.0865
44 54	.5692	.3868	44 64	.5007	.2728	44 74	.3681	.1647	44 84	.2040	.0834
45 55	.5701	.3849	45 65	.4995	.2685	45 75	.3617	.1598	45 85	.1898	.0803
46 56	.5709	.3830	46 66	.4982	.2641	46 76	.3544	.1553	46 86	.1743	.0776
47 57	.5708	.3811	47 67	.4967	.2596	47 77	.3465	.1508	47 87	.1576	.0751
48 58	.5723	.3792	48 68	.4950	.2550	48 78	.3383	.1460	48 88	.1393	.0731
49 59	.5729	.3773	49 69	.4945	.2503	49 79	.3308	.1407	45 89	.1214	.0700
50 60	.5737	.3751	50 70	.4907	.2455	50 80	.3207	.1351	50 90	.1032	.0649
51 61	.5748	.3725	51 71	.4885	.2400	51 81	.3105	.1293	51 91	.0865	.0569
52 62	.5762	.3695	52 72	.4860	.2342	52 82	.2993	.1234	52 92	.0691	.0476
53 63	.5778	.3662	53 73	.4830	.2284	53 83	.2864	.1180	53 93	.0520	.0363
54 64	.5792	.3629	54 74	.4793	.2227	54 84	.2706	.1143	54 94	.0324	.0252
55 65	.5811	.3591	55 75	.4747	.2173	55 85	.2530	.1110	55 95	.0126	.0126
56 66	.5830	.3551	56 76	.4691	.2122	56 86	.2338	.1079			
57 67	.5848	.3511	57 77	.4628	.2070	57 87	.2127	.1049			
58 68	.5868	.3467	58 78	.4561	.2013	58 88	.1891	.1025			
59 69	.5886	.3423	59 79	.4494	.1947	59 89	.1657	.0979			

Ten years difference.			Twenty years difference.			Thirty years difference.		
Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.
60 70	.5904	.3377	60 80	.4421	.1876	60 90	.1424	.0909
61 71	.5921	.3330	61 81	.4382	.1808	61 91	.1204	.0801
62 72	.5937	.3281	62 82	.4175	.1740	62 92	.0973	.0674
63 73	.5946	.3236	63 83	.4103	.1683	63 93	.0740	.0520
64 74	.5950	.3193	64 84	.3935	.1649	64 94	.0467	.0364
65 75	.5942	.3159	65 85	.3737	.1626	65 95	.0184	.0184
66 76	.5921	.3133	66 86	.3512	.1607			
67 77	.5896	.3106	67 87	.3256	.1591			
68 78	.5868	.3075	68 88	.2956	.1586			
69 79	.5848	.3030	69 89	.2651	.1549			
70 80	.5822	.2981	70 90	.2338	.1473			
71 81	.5784	.2936	71 91	.2032	.1338			
72 82	.5729	.2893	72 92	.1695	.1166			
73 83	.5649	.2860	73 93	.1335	.0933			
74 84	.5508	.2866	74 94	.0878	.0682			
75 85	.5342	.2871	75 95	.0361	.0361			
76 86	.5148	.2868						
77 87	.4912	.2869						
78 88	.4601	.2899						
79 89	.4260	.2907						
80 90	.3894	.2864						
81 91	.3544	.2696						
82 92	.3145	.2422						
83 93	.2599	.2072						
84 94	.1835	.1546						
85 95	.0827	.0827						

Fifty years difference.			Sixty years difference.			Seventy years difference.			Eighty years difference.		
Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.	Ages.	Youngest.	Eldest.
1 51	.2419	.3914	1 61	.1957	.3491	1 71	.1544	.3045	1 81	.1194	.2485
2 52	.2761	.2885	2 62	.2184	.2411	2 72	.1622	.1942	2 82	.1189	.1426
3 53	.2879	.2444	3 63	.2245	.1950	3 73	.1604	.1484	3 83	.1042	.1027
4 54	.2954	.2126	4 64	.2276	.1617	4 74	.1573	.1156	4 84	.0901	.0756
5 55	.2979	.1946	5 65	.2275	.1426	5 75	.1523	.0977	5 85	.0768	.0626
6 56	.3005	.1766	6 66	.2275	.1235	6 76	.1477	.0795	6 86	.0649	.0484
7 57	.3011	.1633	7 67	.2266	.1090	7 77	.1433	.0657	7 87	.0546	.0377
8 58	.3014	.1533	8 68	.2251	.0980	8 78	.1390	.0550	8 88	.0457	.0294
9 59	.2998	.1472	9 69	.2226	.0910	9 79	.1346	.0481	9 89	.0382	.0239
10 60	.2972	.1440	10 70	.2194	.0870	10 80	.1301	.0440	10 90	.0318	.0203
11 61	.2940	.1420	11 71	.2156	.0843	11 81	.1250	.0414	11 91	.0274	.0158
12 62	.2906	.1404	12 72	.2114	.0822	12 82	.1193	.0392	12 92	.0204	.0140
13 63	.2870	.1388	13 73	.2070	.0802	13 83	.1137	.0375	13 93	.0149	.0105
14 64	.2833	.1373	14 74	.2022	.0785	14 84	.1068	.0366	14 94	.0091	.0071
15 65	.2793	.1359	15 75	.1973	.0768	15 85	.0993	.0361	15 95	.0035	.0035
16 66	.2751	.1347	16 76	.1909	.0764	16 86	.0912	.0360			
17 67	.2707	.1332	17 77	.1845	.0755	17 87	.0821	.0362			
18 68	.2662	.1311	18 78	.1780	.0739	18 88	.0723	.0360	Ninety years difference.		
19 69	.2617	.1283	19 79	.1713	.0714	19 89	.0623	.0350			
20 70	.2570	.1250	20 80	.1643	.0685	20 90	.0525	.0327	Ages.	Youngest.	Eldest.
21 71	.2524	.1208	21 81	.1569	.0649	21 91	.0433	.0286			
22 72	.2476	.1162	22 82	.1490	.0610	22 92	.0342	.0235	1 91	.1098	.1803
23 73	.2424	.1116	23 83	.1405	.0574	23 93	.0253	.0177	2 92	.0759	.0844
24 74	.2369	.1071	24 84	.1305	.0548	24 94	.0155	.0121	3 93	.0510	.0480
25 75	.2308	.1028	25 85	.1201	.0523	25 95	.0059	.0059	4 94	.0291	.0234
26 76	.2242	.0987	26 86	.1091	.0499				5 95	.0110	.0110
27 77	.2174	.0945	27 87	.0975	.0476						
28 78	.2103	.0902	28 88	.0851	.0456						
29 79	.2031	.0856	29 89	.0731	.0427						
30 80	.1956	.0809	30 90	.0615	.0389						
31 81	.1876	.0763	31 91	.0510	.0335						
32 82	.1788	.0720	32 92	.0402	.0277						
33 83	.1692	.0680	33 93	.0298	.0209						
34 84	.1580	.0650	34 94	.0183	.0143						
35 85	.1460	.0624	35 95	.0059	.0059						
36 86	.1333	.0598									
37 87	.1198	.0574									
38 88	.1052	.0553									
39 89	.0909	.0523									
40 90	.0770	.0481									
41 91	.0641	.0420									
42 92	.0509	.0350									
43 93	.0380	.0265									
44 94	.0235	.0182									
45 95	.0090	.0090									

In the solution of all the problems which involve the contingency in the foregoing table, the constant method of ascertaining it has hitherto been, by taking half the probability of the two lives becoming extinct in a given time, both in the case of the elder life's dying after the younger, and of the younger's dying after the elder. When the ages of the two lives are very different, this method (as I have observed in my former paper) must be incorrect. I have taken considerable pains to determine the extent of the inaccuracy, and for this purpose have computed the following table.

TABLE,

Shewing the value, at 4 per cent. of £ 1, payable at the end of a given time, provided the life of B shall have failed after the life of A.

Ages.		5 years.		10 years.		15 years.		20 years.		25 years.		30 years.		40 years.		Life.	
B*	A	True val.	Approx.	True val.	Approx.	True val.	Approx.	True val.	Approx.	True val.	Approx.	True val.	Approx.	True val.	Approx.	True val.	Approx.
20	10	.00134	.00133	.00448	.00472	.00889	.00979	.01382	.01513	.01879	.02030	.02304	.02457	.02978	.03118	.02099	.02473
35	15	.00194	.00206	.00732	.00785	.01452	.01528	.02245	.02316	.02977	.03041	.03588	.03667	.04392	.04528	.03153	.03936
45	15	.00250	.00266	.00883	.01017	.01882	.01980	.02835	.02958	.03710	.03838	.04456	.04599			.03663	.04829
50	30	.00504	.00503	.01654	.01656	.03057	.03087	.04454	.04523	.05723	.05872	.06639	.06897			.05197	.06819
55	15	.00347	.00369	.01173	.01377	.02464	.02640	.03710	.03925	.04683	.05000					.04022	.05644
65	20	.00725	.00730	.02402	.02410	.04203	.04326	.05460	.05898	.05525	.06692					.04696	.06800
70	40	.01413	.01421	.04303	.04477	.06948	.07697									.06688	.10334
75	60	.03357	.03572	.09545	.10372	.12293	.15521									.11324	.17570
80	70	.07653	.08051	.15576	.18868											.15915	.23503
85	10	.01136	.01374													.01987	.03500

* In these specimens (which are sufficient to give an idea of the difference between the true values and the approximation in all cases) I have constantly supposed the life of B to be the eldest. But the differences would have been the same if his life had been the youngest; only that in this case the true values would have varied as much in *excess* as they here do in *defect*. This is obvious from the nature of the approximation.

From this table it appears, that the approximations and exact values do not differ much from each other till the last years of B's life, and that the principal inaccuracy in adopting the approximation will arise after the extinction of the life of B, when it becomes necessary to multiply the fraction expressing the probability of his dying after A into the remaining series of the solution. But this perhaps will be better understood from the following problems, and from the computations which are made to prove the correctness of the general rules.

PROBLEM 1.

To find the value of an annuity on the life of C after A, on the particular condition that A's life when it fails shall fail before the life of B.

SOLUTION.

As the approximation appears from the preceding table to be always sufficiently correct, except in the two or three last years of B's life, it is evident, that if the fractions which express the probability of B's dying after A in those years, be either confined only to the value of the annuity during that short period, or be not involved at all in the computation, no great inaccuracy will arise from having recourse to the ordinary method of determining that probability, provided the solution be founded on real observations of life, and not on Mr. DE MOIVRE's hypothesis. In the present problem, when C or A is the oldest of the three lives, the abovementioned fractions either never enter into the computation, or are confined to the last years of A's life; and in both cases they are combined

with another contingency, which necessarily renders them of less consequence. The solution, therefore, particularly in the former case, becomes very easy; and even in the latter, by the assistance of the table in my first paper,* it becomes equally simple and correct. But when B is the oldest of the three lives, the above fractions are combined with a series which is often of considerable importance, and consequently the common method of solution fails in this case. Yet even here, being possessed of the table deduced from the foregoing lemma, it is attended with little or no difficulty, and a general rule as short and accurate is obtained as in the other cases. This however will be more satisfactorily proved by the following operations.

1st. *Let C be the oldest of the three lives.* In the first year the payment of the annuity depends on one or other of two events; either that A and B both die (B having died last), and that C lives, the probability of which event is expressed by $\frac{a' \cdot \overline{b-n} \cdot d}{2abc}$, or that only A dies, and that B and C both live, which probability is expressed by $\frac{d'nd}{abc}$. The value, therefore, of the annuity for the first year will be $= \frac{d'bd}{2abcr} + \frac{d'nd}{2abcr}$. In the second year, the payment of the annuity depends nearly on the same events: 1st. that A and B both die in the first or second year (B having died last), and that C lives to the end of this term, which is $= \frac{e}{c} \times \frac{\overline{b-n} \cdot \overline{d'+a'}}{2ab}$; or 2dly, that only A has died before the end of the second year, and that B and C have both lived, which is $= \frac{ne \cdot \overline{d'+a'}}{abc}$. Hence the value of the annuity for the

* Phil. Trans. Vol. LXXVIII. p. 337.

second year will be $= \frac{be \cdot \overline{a'+a''}}{2abcr^2} + \frac{ne \cdot \overline{a'+a''}}{2abcr^3}$. In the third year, by following the same steps, the value of the annuity will be found $= \frac{bf \cdot \overline{a'+a''+a'''}}{2abcr^3} + \frac{of \cdot \overline{a'+a''+a'''}}{2abcr^3}$, and in the remaining years of C's life the value of the annuity may be determined in a similar manner. The whole value of the annuity therefore, when C is the oldest of three lives, will be expressed by the two series $\frac{a'd}{2acr} + \frac{\overline{a'+a''} \cdot e}{2acr^2} + \frac{\overline{a'+a''+a'''} \cdot f}{2acr^3} +$ &c. and $\frac{a'md}{2abcr} + \frac{\overline{a'+a''} \cdot ne}{2abcr^2} + \frac{\overline{a'+a''+a'''} \cdot of}{2abcr^3} +$ &c. The first of these series is $= \frac{C-AC}{2}$, and the second is $= \frac{BC-ABC}{2}$; hence the required value in this case is $= \frac{C-AC}{2} + \frac{BC-ABC}{2}$.

Secondly. *Let A be the oldest of the three lives,* and if z denote the number of years between the ages of A and of the last person in the table, C′ the value of an annuity on the life of C for z years, and B′C′ the same value on the two joint lives of B and C; the value of the annuity for the first z years will evidently in this case be $= \frac{C'-AC}{2} + \frac{B'C'-ABC}{2}$. At the expiration of this term the life of A is necessarily extinct, and consequently the value of the annuity for the remaining years of C's life (supposing δ, ι, ζ, η, &c. to denote the number of persons living in the table at the end of $\overline{z+1}$, $\overline{z+2}$, $\overline{z+3}$, &c. years, and φ to denote the probability of B's surviving A*) will be $= \varphi \times \frac{\delta}{cr^{z+1}} + \frac{\iota}{cr^{z+2}} + \frac{\zeta}{cr^{z+3}} +$ &c. $= \varphi \cdot \overline{C-C'}$. The whole value of the annuity therefore, when A is the oldest

* See the table in the LXXVIIIth Vol. of the Phil. Trans. p. 337. N. B. When this table is used in the present and following problems, certainty must be denoted by unity.

of the three lives, will be $= \frac{C'+BC'}{2} + \varphi \cdot \overline{C-C'} - \frac{AC+ABC}{2}$.

Thirdly. *If B be the eldest of the three lives,* let x denote the number of years between the ages of B and of the last person in the table, C′ the value of an annuity on the life of C for x years, A′C′ the same value on the joint lives of A and C, and π the probability (found by the table in the foregoing lemma), that B dies after A. Then, by proceeding as above, the value of the annuity in this case will be found $= \frac{C-A'C'}{2} + \pi \times \overline{C-C'} + \frac{BC-ABC}{2}$. . Q. E. D.

When the lives are all equal, the general rule deduced either from the series or the foregoing expressions becomes $= \frac{C-CCC}{2}$, which is known to be the exact value in this case from self-evident principles.

As this method of solution is applicable to a great number of problems, I have thought it necessary to make the following computations, with the view of determining how far it may be depended upon. It is to be observed, that the first series of fractions in the above solution, or $\frac{a' \cdot \overline{b-m} \cdot d}{2abcr} + \frac{\overline{a'+a''} \cdot \overline{b-n} \cdot e}{2abcr^2} +$ &c. should have been (according to the lemma), in order to express the exact value, $\frac{a' \cdot \overline{b-m} \cdot d}{2abcr} + \frac{d \cdot \overline{b-n} + a'' + a''' \cdot \overline{m-n} \cdot e}{2abcr^2} +$ &c. and that it is impossible to find a general expression which shall be equal to this latter series and at the same time fit for use. This has rendered it necessary to have recourse to the present approximation. But in the first column of the following examples, each term of this last series has been separately computed, so that by comparing the values in that and the second column an exact idea may be formed of the accuracy of the preceding rules.

Ages of C.	B.	A.	Annuity of £ 1. True value.	Approximation.
78	15	75	.138	.146
70	20	65	.406	.408
81	70	80	.530	.550
15	85	10	13.833	13.782
15	75	15	11.385	11.230
35	75	15	8.968	8.834
15	65	20	8.485	8.379
15	80	70	9.893	9.529
15	10	85	.647	.698
15	15	75	1.038	1.193
35	15	75	.786	.920
15	20	65	1.769	1.876
15	70	80	4.307	4.671

From these examples it appears, that when C or A is the oldest of the three lives, the approximated and the true values agree sufficiently near for any useful purpose; and that even when B is the oldest, the difference is almost as inconsiderable. It should likewise be observed, that these examples are cases in which the difference is likely to be greatest, and therefore a nearer approximation need not be required. Both Mr. SIMPSON and myself have given solutions of this problem, and in most of the foregoing examples the values derived from them are more correct than could have been expected; but these solutions being founded on a wrong hypothesis, are not so correct as the present, except when C is the oldest of the

three lives, nor are they even more simple, so that it can now be seldom necessary to have recourse to them. Without the assistance of the preceding lemma, and the computations which have been just made, it would not have been possible to have ascertained the degree of accuracy of any approximation; and therefore were no other end answered by them, this of itself would be of sufficient consequence to deserve the time and labour which I have bestowed upon this subject. But it will appear, in the solution of some of the succeeding problems, that the use and application of this lemma, and especially of the table deduced from it, are much more extensive and important.

PROBLEM II.

To find the value of an annuity during the life of C, after the decease of A, provided A should survive B.

SOLUTION.

The payment of this annuity depends only on one contingency; and that is, the extinction of the two lives of A and B before the end of each year (B having died first), and the continuance of the life of C to the end of those respective years. The value therefore of the annuity for the first year will be $= \frac{d \cdot \overline{b-m} \cdot a'}{2abcr}$, for the second year $= \frac{e \cdot \overline{b-n} \cdot \overline{a'+a'}}{2abcr^2}$, for the third year $= \frac{f \cdot \overline{b-o} \cdot \overline{a'+a'+a''}}{2abcr^3}$, and so on for the remaining years. The value of the annuity (*when C is the oldest life*) will consequently be expressed by the two series $\frac{da'}{2acr} + \frac{e \cdot \overline{a'+a''}}{2acr^2} +$

$\frac{f \cdot \overline{a'+a''+a'''}}{2acr^3}$ + &c. . . . and $-\frac{mda'}{2abcr} - \frac{ne \cdot \overline{a'+a''}}{2abcr^2} - \frac{of \cdot \overline{a'+a''+a'''}}{2abcr^3} -$ &c. $= \frac{C-AC}{2} - \frac{BC-ABC}{2}$. If *A be the oldest of the three lives* this rule will be insufficient. Let z, C′, B′C′ and φ denote the the same quantities as in the second part of the preceding problem; then will the value of the annuity in this case, for the first z years, be $= \frac{C'-AC}{2} - \frac{B'C'-ABC}{2}$, and its value for the remaining years of C's life $= \overline{1-\varphi} \cdot \overline{C-C'}$; for the payment of it during this last term depends on the contingency of C's living so long, and of A's having survived B, which probability is $= 1-\varphi$; therefore the whole value will be $= C - \frac{C'+B'C'}{2} - \varphi \cdot \overline{C-C'} - \frac{AC-ABC}{2}$.

If B *be the oldest of the three lives*, let x, π, C′, A′C′, δ, ϵ, ζ, &c. denote the same quantities as in the third part of the foregoing problem; also let x' denote the sum of the decrements of the life of A for x years, and α', α'', α''', &c. the decrements of the same life in the $\overline{x+1}$st, $\overline{x+2}$d, $\overline{x+3}$d, &c. years. The value of the annuity for the first x years will it is evident be $= \frac{C'-A'C'}{2} - \frac{BC-ABC}{2}$. In the $\overline{x+1}$st year the payment of it will depend on the contingency of A's having died after B in $\overline{x+1}$ years, and C's having lived to the end of this term. As the life of B becomes necessarily extinct in x years, it is plain that the probability of A's dying after him in $\overline{x+1}$ years must be $= \frac{x'+\alpha'}{a} - \pi$, and therefore that the value of the annuity in this year will be $= \frac{x'+\alpha'}{a} \times \frac{\delta}{cr^{x+1}} - \frac{\pi \cdot \delta}{cr^{x+1}}$. In the same manner the value of the annuity in the $\overline{x+2}$d,

$\overline{x+3d}$, &c. years will be $= \frac{x'+a'+a''}{a} \times \frac{1}{cr^{x}+1} - \frac{\pi \cdot 1}{cr^{x}+1} + \ldots$ &c. But the series $\frac{x'+a'}{a} \times \frac{\beta}{cr^{x}+1}$ $+ \frac{x'+a'+a''}{a} \times \frac{1}{cr^{x}+1} +$ &c. is $= \overline{C - C'} - \overline{AC - A'C'}$, and the series $\frac{\pi \cdot \beta}{cr^{x}+1} + \frac{\pi \cdot 1}{cr^{x}+1} +$ &c. is $= \pi \cdot \overline{C - C'}$, the whole value of the annuity therefore, when B is the eldest, will be $=$ $C - AC - \frac{C' - A'C'}{2} - \frac{BC - ABC}{2} - \pi \cdot \overline{C - C'}$.

COROLLARY.

If the solution of either of these two problems be given, the solution of the other problem may be immediately derived from it; for the value of the reversion in one is no more than the difference between the value of the reversion in the other, and the value of an annuity on the life of C after A. In other words, let the value found by either of these problems be called Q, and the required value of the reversion in the other problem, supposing the ages of A, B, and C to be the same in both, will be $= \overline{C - AC} - Q$. This deduction is self-evident, and if applied to any of the foregoing rules will be found to confirm the truth of the solution.

PROBLEM III.

To find the value of a given sum payable on the death of A and C, provided B should survive one life in particular (A).

SOLUTION.

In the first year the payment of the given sum will depend upon either of two events; 1st, that all the three lives shall drop (B having survived A) which is $= \frac{\overline{b-m} \cdot \overline{c-d} \cdot a'}{2abc}$. 2dly, That B shall live, and only A and C die, which is $= \frac{\overline{c-d} \cdot md'}{abc}$. The value therefore of the given sum in the first year will be $= \frac{S \cdot a'}{abcr} \times \frac{\overline{bc+mc-bd-md}}{2}$. In the second and following years the payment of S will depend upon either of seven events: 1st. that all the three lives drop in the year, B having survived A. 2dly, That B lives, and only A and C die in the year. 3dly, that A dies in the year, C dies in any of the foregoing years, and B lives. 4thly, That B dies after A in the year, and C dies in any of the foregoing years. 5thly, That C dies in the year, and B dies after A in any of the foregoing years. 6thly, That B and C both die in the year, and A dies in any of the foregoing years. And 7thly, That C dies in the year, A in any of the foregoing years, and B lives. From the several fractions expressing these contingencies the value of the given sum will be found $= \frac{S}{2ab} \times \overline{\frac{a'b}{r} + \frac{a''m}{r^2} + \frac{a'' \cdot n}{r^3} + \&c.} + \frac{S}{2ab} \times \overline{\frac{a'm}{r} + \frac{a'n}{r^2} + \frac{a'' \cdot o}{r^3} + \&c.} - \frac{S}{2abc} \times \overline{\frac{a'bd}{r} + \frac{a''me}{r^2} + \frac{a''nf}{r^3} + \&c.} - \frac{S}{2abc} \times \overline{\frac{a'md}{r} + \frac{a'ne}{r^2} + \frac{a''of}{r^3} + \&c.} + \frac{S}{2acr} \times \overline{\frac{a'd}{r} + \frac{\overline{a'+a''} \cdot e}{r^2} + \&c.} + \frac{S}{2abcr} \times \overline{\frac{a'md}{r} + \frac{\overline{a'+a''} \cdot ne}{r^2} + \&c.} - \frac{S}{2acr} \times \overline{\frac{a'e}{r} + \frac{\overline{a'+a''} \cdot f}{r^2} + \&c.} - \frac{S}{2abcr} \times \overline{\frac{a'me}{r} + \frac{\overline{a'+a''} \cdot nf}{r^2} + \&c.} = E + \frac{S}{2r} \times \overline{C - CA - \overline{r-1} \cdot \overline{BC - ABC} - \frac{S \cdot \beta}{2b} \times \overline{FC - AFC} + \frac{S \cdot d}{2cr} \times \overline{\frac{m \cdot PT - APT}{b} -}}$

$\overline{T-AT}$. If *A be the oldest of the three lives*, let z, C′, B′C′, and φ denote the same quantities as in the second part of prob. I, and let F′C′ be the value of the joint lives of F and C for z years, it will then be evident that the value of the reversion for the first z years will be $= E + \frac{S}{2r} \times \overline{C'-A'C'-r-1}.\ \overline{B'C'-ABC} - \frac{S.\beta}{2b} \times \overline{F'C'-AFC} + \frac{S.d}{2cr} \times \frac{\overline{m.FT'-AF'T}}{b} - \overline{T'-AT}$, and its value after this term $= \frac{S.\overline{r-1}}{r^{z+1}} \times \frac{\varphi.k}{c} \times \overline{V-C^z}$; C^z being the value of an annuity on a life z years older than C, and k the number of persons living at the age of C^z... If *B be the oldest of the three lives*, the value, by proceeding as above, may be easily found $= E + \frac{S}{2r} \times \overline{C'-A'C'-r-1}.\ \overline{BC-ABC} - \frac{S.\beta}{2b} \times \overline{FC-AFC} + \frac{S.d}{2cr} \times \frac{\overline{m.FT-AF'T}}{b} - \overline{T'-A'T'} + \frac{S.\overline{r-1}}{r^{x+1}} \times \frac{\pi.q}{c} \times \overline{V-C^x}$; C′, A′C′, π and x denoting the same quantities as in the third part of prob. I, C^x the value of an annuity on a life x years older than C, q the number of persons living at the age of C^x... and T′ and A′T′ the values of annuities on the single life of T, and on the joint lives of A and T for x years.

But the solution of this problem may be obtained rather more easily by the assistance of the first problem in this paper, and of the second problem which I communicated to the Royal Society in the year 1788.* For the value of a given sum payable on the death of A and C should B survive A, is evidently "the difference between the value of that sum depending on "the contingency of B's surviving A, and the value of an

* Phil. Trans. Vol. LXXVIII. p. 341.

" annuity equal to the interest of the given sum during the life " of C after A, provided A should die before B." The first of these is E, and if an annuity of £ 1. by prob. I, be denoted by Q, the second will be $= \frac{S.\overline{r-1}.Q}{r}$. The required value therefore will be $= E - \frac{S.\overline{r-1}.}{r} \times Q$ ..... If *the three lives be equal*, the general theorem will become $= \frac{S.\overline{r-1}.}{r} \times \overline{V - CC - C - CCC}$, which may be derived from either of the foregoing rules, or from the different series given above.

PROBLEM IV.

To find the value of a given sum S, payable on the death of A and C, should B die before one life in particular (A).

SOLUTION.

The payment of S in the first year depends on the contingency of the three lives having become extinct (A having survived B), which is expressed by $\frac{\overline{b-m}.\overline{c-d}.a'}{2abc}$, and therefore the value of S in this year will be $= \frac{S.a'}{2abcr} \times \overline{bc - mc - bd + ma'}$. In the second and following years the sum S will become payable if either of five events should take place. 1st, If the *three lives* should drop in the year (B having died before A). 2dly, If C should die in any of the preceding years, and A die after B in that particular year. 3dly, If B and C should die in any of the preceding years, and only A die in that year. 4thly, If B should die in any of the preceding

years, and A and C both die in that year: and 5thly, If A should die after B in any of the preceding years, and C die in that year. From the different fractions expressing those probabilities, the value of S may be found $= \frac{S}{a} \times \overline{\frac{a'}{r} + \frac{a''}{r^2} + \frac{a'''}{r^3} + \&c.}$ $+ \frac{S}{acr} \times \overline{\frac{da'}{r} + \frac{e \cdot a' + a''}{r^2} + \&c.} - \frac{S}{2ab} \times \overline{\frac{a'm}{r} + \frac{a''n}{r^2} + \frac{a'''o}{r^3} + \&c.} +$ $\frac{S}{2abc} \times \overline{\frac{a'bd}{r} + \frac{a''me}{r^2} + \frac{a'''nf}{r^3} + \&c.} + \frac{S}{2abc} \times \overline{\frac{a'md}{r} + \frac{a''ne}{r^2} + \frac{a'''of}{r^3} + \&c.}$ $- \frac{S}{2acr} \times \overline{\frac{da'}{r} + \frac{e \cdot a' + a''}{r^2} + \&c.} - \frac{S}{2abcr} \times \overline{\frac{a'md}{r} + \frac{a' + a' \cdot ne}{r^2} + \&c.} +$ $\frac{S}{2acr} \times \overline{\frac{ea'}{r} + \frac{f \cdot a' + a''}{r^2} + \&c.} + \frac{S}{2abcr} \times \overline{\frac{a'me}{r} + \frac{a' + a' \cdot nf}{r^2} + \&c.}$ The three first of these series are $= \frac{S \cdot \overline{r-1}}{r} \times \overline{V - A - C + AC}$, and the remaining eight denote the value of S by the third problem, with contrary signs. If this last value be called Y, and the value of an annuity of £ 1. on the longest of the two lives of A and C be called Z, the required value will be $= \frac{S \cdot \overline{r-1}}{r} \times \overline{V - Z - Y}$; that is, the value of the given sum in this case is "the difference between its value after the extinc-"tion of the lives of A and C, on the contingency of B's sur-"viving A, and the whole value of the reversion after the "death of A and C, without any restriction." This rule is self-evident, and proves the truth of the foregoing investigations. The solution of this problem may also be derived from the second problem in this paper, and the third problem in my paper communicated in the year 1788.* In other words, "the "value of S in the present case is equal to the difference be-"tween its value after the death of A and B, provided B

* Phil. Trans. Vol. LXXVIII. p. 347.

"should die before A, and the value of an annuity equal to "the interest of S during the life of C after A, provided A "should survive B." Let the first of these values be denoted by W, and the second by X, and the required value will be $= W - \frac{S.\overline{r-1}}{r} \times X$. When the three lives are equal, the value of the reversion evidently becomes $= \frac{S.\overline{r-1}}{2r} \times \sqrt{V - L}$, which expression may be easily derived from either of the rules given above, or immediately from the series themselves.

Having given so many examples of the accuracy of the rules in the first and second problems, it becomes unnecessary to add any further examples in regard to the two foregoing problems, as the solutions of the latter are derived from those of the former, and consequently are equally correct in all cases.

PROBLEM V.

To find the value of a given sum payable on the *decease* of B and C, should their lives be the *last* that shall fail of the three lives A, B, and C.

SOLUTION.

In the first year the given sum can be received only provided the three lives shall have failed, and the life of A have been the first that became extinct. In the second and following years it may be received provided either of four events shall have happened: 1st, If all the three lives shall have failed in that year, A dying first. 2dly, If A shall have died in any of the foregoing years, and B and C both died in that

year. 3dly, If B and A shall have both died in the foregoing years (B dying last), and C died in that year. 4thly, If C and A shall have both died in the foregoing years (C dying last), and B died in that year. From the fractions expressing these several contingencies the value of the reversion will be found $= \frac{S}{3abc} \times \overline{\frac{a'bc}{r} + \frac{a''md}{r^2} + \frac{a'''ne}{r^3} + \&c.} - \frac{S}{3abc} \times \overline{\frac{a'me}{r} + \frac{a''nd}{r^2} + \frac{a'''oe}{r^3} + \&c.}$ $- \frac{S}{2abcr} \times \overline{\frac{nd \cdot a'}{r} + \frac{eo \cdot \overline{a'+a''}}{r^2} + \&c.} - \frac{S}{3abc} \times \overline{\frac{a'bd}{r} + \frac{a''me}{r^2} + \frac{a'''nf}{r^3} +}$ $\overline{\&c.} - \frac{S}{2abcr} \times \overline{\frac{me \cdot a'}{r} + \frac{nf \cdot \overline{a'+a''}}{r^2} + \&c.} + \frac{S}{3abc} \times \overline{\frac{a'md}{r} + \frac{a''ne}{r^2} + \frac{a'''of}{r^3}}$ $\overline{+ \&c.} + \frac{S}{abcr} \times \overline{\frac{d'ne}{r} + \frac{\overline{a'+a''} \cdot of}{r^2} + \&c.} + \frac{S}{2acr} \times \overline{\frac{\overline{d-e} \cdot a'}{r} + \frac{\overline{e-f} \cdot \overline{a'+a''}}{r^2}}$ $\overline{+ \&c.} + \frac{S}{2abr} \times \overline{\frac{\overline{m-n} \cdot a'}{r} + \frac{\overline{n-o} \cdot \overline{a'+a''}}{r^2} + \&c.} = S \text{ into } \frac{\overline{r-1}}{r} \times$ $\frac{\overline{V - ABC}}{3} - \frac{B+C}{2} + BC - \frac{AB+AC}{2r} + \frac{m}{2br} \times \overline{1 + AP} - \frac{\overline{PC-APC}}{3}$ $+ \frac{d}{2cr} \times \overline{1 + AT} - \frac{\overline{BT-ABT}}{3} - \frac{\overline{4m.1+APT}}{3b} - \frac{\beta \cdot \overline{FC - AFC}}{3b} - \frac{\pi}{3c} \times$ $\overline{BK - ABK} + \frac{\beta \cdot AFK}{b}$. If B and C are both of them older than A, and also are nearly of the same age, this general rule will be sufficiently correct. But if the ages of B and C differ much from each other, it is evident that the annuity on the single life of the younger of them (suppose C), and on the joint lives of AC and AT, ought to be continued only for as many years as are equal to the difference between the age of B and of the oldest life in the table of observations. In this case also there is a further value of S, after the necessary extinction of the life of B, arising from the contingency of that life's having failed after the life of A, and of C's having failed after both of them. Let x, π, C′, and A′C′ respectively denote the same

values as in the third part of the first problem, and let $\overline{A'T'}$ denote the value of an annuity on the joint lives of A and T for x years, $\overline{P'}$ the value of an annuity on the life of P for the same term, C^x the value of an annuity on a life x years older than C, and k the number of persons living in the table at that age, then will the value of the given sum be in this case

$$= S \text{ into } \frac{r-1 \,.\, \overline{BC-ABC}}{3r} + \frac{s}{3c} \times \frac{\beta \,.\, \overline{FK-AFK}}{b} - \overline{BK-ABK} - \frac{\beta \,.\, \overline{FC-AFC}}{3b} + \frac{m}{2br} \times \frac{4d \,.\, \overline{PT-APT}}{3c} - \frac{\overline{PC-APC}}{3} - \overline{P'-A'P'} - \frac{d}{2cr} \times \frac{\overline{BT-ABT}}{3} + \overline{T'-A'T'} + \frac{B+C'-AB+A'C'}{2r} + \frac{w \,.\, k \,.\, r-1}{cr^{w}+^{1}} \times \overline{V-C^x}.$$

If A be the oldest of the three lives, it will be necessary to substitute $a-s$, $s-t$, $t-u$, &c. for their equals a', a'', a''', &c. and b', b'', b''', &c. for their equals $\overline{b-m}$, $\overline{m-n}$, $\overline{n-o}$, &c. In this case let C be supposed the oldest of B and C, and the series expressing the value of the reversion during the life of A will become

$$\frac{2 \,.\, S}{3abc} \times \frac{adb'}{r} + \frac{esb'}{r^2} + \frac{ftb''}{r^3} + \&c. + \frac{S}{2abcr} \times \frac{esb'}{r} + \frac{ft \,.\, \overline{b'+b''}}{r^2} + \&c. + \frac{S}{3abc} \times \frac{dsb'}{r} + \frac{etb''}{r^2} + \frac{fub'''}{r^3} + \&c. - \frac{S}{6abc} \times \frac{acb'}{r} + \frac{dsb''}{r^2} + \frac{etb'''}{r^3} + \&c. - \frac{S}{2abcr} \times \frac{dsb'}{r} + \frac{et \,.\, \overline{b'+b''}}{r^2} + \&c. - \frac{S}{3abc} \times \frac{csb'}{r} + \frac{dtb''}{r^2} + \frac{eub'''}{r^3} + \&c. + \frac{S}{2b} \times \frac{b'}{\zeta} + \frac{b''}{r^2} + \frac{b'''}{r^3} + \&c. - \frac{S}{2ab} \times \frac{ab'}{r} + \frac{sb''}{r^2} + \frac{tb'''}{r^3} + \&c. + \frac{S}{2bc} \times \frac{cb'}{r} + \frac{db''}{r^2} + \frac{eb'''}{r^3} + \&c. - \frac{S}{bc} \times \frac{db'}{r} + \frac{eb''}{r^2} + \frac{fb'''}{r^3} + \&c. + \frac{S}{2bcr} \times \frac{\overline{d-e} \,.\, b'}{r} + \frac{\overline{e-f} \,.\, \overline{b'+b''}}{r^2} + \&c.$$

Let y represent the difference between the ages of A and of the oldest person in the table, let K', C', B', T', $B'C'$, $B'K'$,

and B′T′, respectively denote the values of annuities on those single and joint lives for y years, then will the first and second series be $= \frac{2a \cdot \overline{HC-HBC}}{3a} - \frac{d}{6cr} \times \overline{AT-ATB}$, the third series $= \frac{\overline{AC-ABC}}{3} - \frac{ds}{3acr} \times \overline{NT-NBT} = \frac{ds}{3acr} \times \overline{1+NBT} - \frac{\overline{ABC}}{3}$, the fourth and fifth series $= \frac{-ax \cdot \overline{HK-HBK}}{6ac} - \frac{\overline{AC-ABC}}{3r} = \frac{ax \cdot \overline{HBK}}{6ac} - \frac{1}{6r} + \frac{\overline{ABC}}{3r} - \frac{\overline{AC}}{2r}$, the sixth series $= \frac{-x \cdot \overline{AK-ABK}}{3c} + \frac{s \cdot \overline{NC-NBC}}{3cr}$, the seventh series $= \frac{\overline{r-1} \cdot \overline{V-B}}{2r}$, the eighth series $= \frac{-a \cdot \overline{H-HB}}{2a} + \frac{\overline{A-AB}}{2r} = \frac{a \cdot \overline{HB}}{2a} - \frac{1+AB}{2r}$, the th series $= \frac{x \cdot \overline{K'-BK'}}{2c} - \frac{\overline{C-BC'}}{2r}$, the tenth series $= -\overline{C'-BC'} + \frac{d}{cr} \times \overline{T'-BT'}$, and the eleventh series $= \frac{\overline{C-BC'}}{2r} - \frac{d}{2cr} \times \overline{T'-BT'}$. In order to obtain the value of S after the necessary extinction of the life of A, let π and μ denote the probability that B and C respectively die after A; k, δ, ϵ, ζ, &c. the number of persons living in the table opposite the age of C at the end of y, $\overline{y+1}$, $\overline{y+2}$, &c. years; p the number of persons living opposite the age of B at the end of y years; and β', β'', β''', &c. the decrements of life at the age of B after $\overline{y+1}$, $\overline{y+2}$, $\overline{y+3}$, &c. years. In the $\overline{y+}$ 1st year the given sum may be received, provided either of three events shall have happened. 1st, If B and C shall have both died in that year. 2dly, If C only shall have died, B having died after A in the first y years. 3dly, If B only shall have died, C having died after A in the first y years. The value of S depending on these contingencies will be $= \frac{S}{r} \times \frac{\beta \cdot \overline{k-\delta}}{bcr} + \frac{S \cdot \pi \cdot \overline{k-\delta}}{cr^{y+1}} + \frac{S \cdot \mu \cdot \beta'}{br^{y+1}}$. In the $\overline{y+}$ 2d,

$\overline{y+3}$d, &c. years, the given sum may be received, provided either of five events shall have happened. 1st, If both the lives of B and C shall have become extinct in the year. 2dly, If C only shall have failed, B having died after A in the first y years. 3dly, If B only shall have failed, C having died after A in the first y years. 4thly, If B shall have failed, C having died in any of the preceding years after the first y years: and 5thly, If C shall have failed, B having died in any of the preceding years after the first y years. The series therefore expressing the value of S after the necessary extinction of A's life will be $\frac{S}{bcr^y} \times \overline{\frac{k-\delta \,.\, \beta}{r} + \frac{\delta-1 \,.\, \beta'}{r^2} + \frac{1-\zeta \,.\, \beta''}{r^3} + \&c.} + \frac{S \,.\, \varpi}{cr^y} \times \overline{\frac{k-\delta}{r} + \frac{\delta-1}{r^2} + \frac{1-\zeta}{r^3} + \&c.} + \frac{S \,.\, \mu}{br^y} \times \overline{\frac{\beta}{r} + \frac{\beta'}{r^2} + \frac{\beta''}{r^3} + \&c.} + \frac{S}{bcr^y} \times \overline{\frac{\delta-1 \,.\, \beta'}{r^2} + \frac{1-\zeta \,.\, \beta+\beta''}{r^3} + \&c.} + \frac{S}{bcr^y} \times \overline{\frac{k-\delta \,.\, \beta'}{r^2} + \frac{k-1 \,.\, \beta''}{r^3} + \&c.}$ $= \frac{S \,.\, \varpi}{cr^y} \times \overline{\frac{k-\delta}{r} + \frac{\delta-1}{r^2} + \&c.} + \frac{S\mu}{br^y} \times \overline{\frac{\beta}{r} + \frac{\beta'}{r^2} + \frac{\beta''}{r^3} + \&c.} + \frac{Sk}{cr^y} \times \frac{\beta}{r} + \frac{\beta'}{r^2} + \frac{\beta''}{r^3} + \&c. - \frac{S}{bcr^y} \times \overline{\frac{\delta\beta}{r} + \frac{\varepsilon\beta'}{r^2} + \frac{\zeta\beta''}{r^3} + \&c.} + \frac{S}{bcr^y} \times \overline{\frac{\delta-1 \,.\, \beta}{r^2} + \frac{1-\zeta \,.\, \beta+\beta'}{r^3} + \&c.}$ The three first of these series are $= \frac{S \,.\, \varpi k \,.\, r-1 \,.\, \overline{V-C}}{cr^{y+1}} + \frac{S\mu \,.\, r-1}{br^{y+1}} \times \overline{\mu + \frac{k}{c} \times \overline{V-B}}^{y}$, supposing C^y and B^y respectively to be the values of annuities on the single lives of persons y years older than C and B. The other two series are a continuation of the tenth and eleventh series in the former part of this solution, so that the sum of those four series will be $= \frac{d}{cr} \times \overline{T-BT} - \overline{C-BC} + \frac{C-BC}{r} - \frac{d}{cr} \times \overline{T-BT} - \frac{C'-B'C'}{2r} + \frac{d \,.\, \overline{T'-B'T'}}{2cr} = \frac{d}{2cr} \times \overline{T'-B'T'} - \frac{C'-B'C'}{2r} -$

$\frac{r-1 \cdot \overline{C-BC}}{r}$, and the whole value of the given sum will be $=$ S into $\frac{r-1 \cdot \overline{V-L}}{3r} + \frac{B'C'-C'}{r} - \frac{r-1 \cdot \overline{V+B'+AB+AC}}{2r} + \frac{x}{2c} \times \frac{n \cdot HBK}{3a}$ $+ \overline{K'-B'K'} - \frac{2 \cdot \overline{AK-ABK}}{3} + \frac{n}{2a} \times HB + \frac{4 \cdot \overline{HC-HBC}}{3} + \frac{s}{3ar}$ $\times \overline{NC-NBC} + \frac{d}{2cr} \times \overline{T'-B'T'} + \frac{2s \cdot 1+NBT}{3c} - \frac{AT-ABT}{3} +$ $\frac{w \cdot k \cdot r-1 \cdot}{cr^2+r} \times \overline{V-C'} + \overline{\mu} + \frac{k}{c} \times \frac{p \cdot r-1}{br^2+r} \times \overline{V-B'}$.

If *the three lives be equal*, the two first rules become S into $\frac{r-1 \cdot \overline{V-L}}{3r} + \frac{d}{cr} \times 1 + \frac{2CT+CCT}{3} - \frac{2dd}{3ccr} \times \overline{1+CTT} - \frac{xx}{3cc} \times$ $CKK - \frac{2x}{3c} \times \overline{CK-CCK}$, and the last rule becomes S into $\frac{r-1 \cdot \overline{V-L}}{3r} + \frac{xx \cdot CKK}{6cc} + \frac{x}{3c} \times \overline{CK-CCK} - \frac{d}{3cr} \times CT - \frac{d}{6cr}$ $\times CCT - \frac{d}{2cr} + \frac{dd}{3ccr} \times \overline{1+CTT}$. If all the expressions, except the first, in these rules be resolved into their respective series, they will be found to destroy each other, and the general rule in both cases will become simply $= \frac{S \cdot r-1 \cdot \overline{V-L}}{3r}$, which is known from self-evident principles to express the true value in this particular case. The same general rule may also be obtained immediately from the series which denote the value of S in each year, for in the first year its value will in this case be $= \frac{S \cdot \overline{c-d}^2}{3c^2r}$, in the second year $= \frac{S \cdot \overline{d-e}^2}{3c^2r^2} + \frac{S \cdot \overline{c-d} \cdot \overline{d-e}^2}{c^2r^2}$ $+ \frac{S \cdot \overline{c-d}^2 \cdot \overline{d-e}}{c^2r^2}$, in the third year $= \frac{S \cdot \overline{e-f}^2}{3c^2r^3} + \frac{S \cdot \overline{c-e} \cdot \overline{e-f}^2}{c^2r^3} +$ $\frac{S \cdot \overline{c-e}^2 \cdot \overline{e-f}}{c^2r^3}$, and so on; hence the whole value will be $=$ $\frac{S}{3r} - \frac{S}{c} \times \frac{d}{r} + \frac{e}{r^2} + \frac{f}{r^3} + \&c. + \frac{S}{cc} \times \overline{\frac{dd}{r} + \frac{ee}{r^2} + \frac{ff}{r^3} + \&c.} - \frac{S}{c^3}$

$\times \sqrt{\frac{d^2}{r} + \frac{e^2}{r^2} + \frac{f^2}{r^3} + \&c.} + \frac{S}{cr} \times \sqrt{\frac{d}{r} + \frac{e}{r^2} + \frac{f}{r^3} + \&c.} - \frac{S}{ccr} \times \sqrt{\frac{dd}{r} + \frac{ee}{r^2} + \frac{ff}{r^3} + \&c.} + \frac{S}{c^2 r} \times \sqrt{\frac{d^2}{r} + \frac{e^2}{r^2} + \frac{f^2}{r^3} + \&c.} = \frac{S \cdot r-1}{3r} \times \sqrt{V-L}$. Q. E. D.

PROBLEM VI.

To find the value of a given sum payable on the death of C, provided A should be the first, B the second, and C the third that shall fail of the three lives A, B, and C.

SOLUTION.

When C is the oldest of the three lives. To receive the given sum in the first year, it is only necessary that the three lives should become extinct in the order specified in this problem, and therefore the value of S for this year will be $= \frac{S \cdot \overline{b-m} \cdot \overline{e-d} \cdot a'}{6abcr}$. In the second year the given sum may be received, provided either of three events shall take place; 1st, That all the lives fail in the order required by the problem. 2dly, That B dies after A in the first year, and C dies in the second year. 3dly, That A only dies in the first year, and C dies after B in the second year. Hence the value of S for this year will be $= \frac{S \cdot \overline{m-n} \cdot \overline{d-e} \cdot a'}{6abcr^2} + \frac{S \cdot \overline{b-m} \cdot \overline{d-e} \cdot a'}{2abcr^2} + \frac{S \cdot \overline{m-n} \cdot \overline{d-e} \cdot a'}{2abcr^2}$. To receive the given sum in the third year either of the same events must take place. 1st, The three lives must drop in the order stated above; or 2dly, B must die after A in the first or second year, and C die in the third year; or

3dly, A must die in the first or second year, and C die after B in the third year. The value therefore of S for this year will be $= \frac{S \cdot \overline{n-o} \cdot \overline{e-f} \cdot a''}{6abcr^3} + \frac{S \cdot \overline{b-n} \cdot \overline{e-f} \cdot \overline{a'+a''}}{2abcr^3} + \frac{S \cdot \overline{n-o} \cdot \overline{e-f} \cdot \overline{a'+a''}}{2abcr^3}$. By pursuing the same steps during C's life, the whole value may be found $= \frac{S}{6abc} \times \overline{\frac{a'bc}{r} + \frac{a'md}{r^2} + \frac{a''ne}{r^3}} + \&c. - \frac{S}{6abc} \times \overline{\frac{a'me}{r} + \frac{a'nd}{r^2} + \frac{a''oe}{a^3}} + \&c. - \frac{S}{2abcr} \times \overline{\frac{nd \cdot a'}{r} + \frac{oe \cdot \overline{a'+a''}}{r^2}} + \&c. - \frac{S}{6abc} \times \overline{\frac{a'bd}{r} + \frac{a'me}{r^2} + \frac{a''nf}{r^3}} + \&c. + \frac{S}{6abc} \times \overline{\frac{a'md}{r} + \frac{a'ne}{r^2} + \frac{a''of}{r^3}} + \&c. + \frac{S}{2abcr} \times \overline{\frac{ne \cdot a'}{r} + \frac{of \cdot \overline{a'+a''}}{r^2}} + \&c. + \frac{S}{2acr} \times \overline{\frac{d-e \cdot a'}{r} + \frac{\overline{e-f} \cdot \overline{a'+a''}}{r^2}} + \&c. = S \text{ into } \frac{n}{6c} \times \overline{\frac{\beta \cdot FK - AFK}{b} - \overline{BK - ABK}} + \overline{\frac{r-1 \cdot BC - ABC}{6r}} + \frac{m}{3br} \times \overline{\frac{d \cdot PT - APT}{c} - \overline{PC - APC}} - \frac{\beta \cdot FC - AFC}{6b} + \frac{C - AC}{2r} + \frac{d}{2cr} \times \frac{BT - ABT}{3} - \overline{T - AT}$.

When B is the oldest of the three lives, it is evident that none of the foregoing series ought to be continued beyond the extinction of B's life, and that after this period the payment of the given sum will depend simply upon the failure of C's life in each of the remaining years, A having previously been survived by B. Let the difference between the age of B and of the oldest person in the table of observations be denoted by x, the probability that B dies after A by π, the value of an annuity on the life of a person x years older than C by C^x, the number of living at this age by k, and the values of annuities on the single and joint lives of A, C, and T for x years by C', T', $A'C'$ and $A'T'$, then will the required value in this case be $=$ S into $\frac{n}{6c} \times \overline{\frac{\beta \cdot FK - AFK}{b} - \overline{BK - ABK}} + \overline{\frac{r-1 \cdot BC - ABC}{6r}} + \frac{m}{3br}$

$$\times \frac{d \cdot PT - APT}{c} - PC - APC - \frac{\beta \cdot FC - AFC}{6b} + \frac{C' - A'C'}{2r} + \frac{d}{2rc} \times \frac{BT - ABT}{3} - T' - A'1' + \frac{\pi k \cdot r - 1}{cr^{z+1}} \times V - C^{z}.$$

When A is the oldest and B the youngest of the three lives, let the symbols be changed which denote the decrements and probabilities of life of A and B; let z be the difference between the age of A, and the oldest person in the table, and the whole value of the given sum during the life of A will be $= \frac{S}{2bc} \times \frac{cb'}{r} + \frac{db'}{r^2} + \frac{eb''}{r^3} + \ldots . (z) + \frac{S}{2bcr} \times \frac{db'}{r} + \frac{e \cdot b' + b'}{r^2} + \ldots . (z) - \frac{S}{2bc} \times \frac{db'}{r} + \frac{eb''}{r^2} + \frac{fb'''}{r^3} + \ldots . (z) - \frac{S}{2bcr} \times \frac{eb'}{r} + \frac{f \cdot b' + b''}{r^2} + \ldots . (z) - \frac{S}{3abc} \times \frac{acb'}{r} + \frac{sdb'}{r^2} + \frac{te \cdot b'''}{r^3} + \&c. - \frac{S}{2abcr} \times \frac{sd \cdot b'}{r} + \frac{te \cdot b' + b''}{r^2} + \&c. + \frac{S}{3abc} \times \frac{adb'}{r} + \frac{se \cdot b''}{r^2} + \frac{tf \cdot b'''}{r^3} + \&c. + \frac{S}{2abcr} \times \frac{sdb'}{r} + \frac{tf \cdot b' + b''}{r^2} + \&c. - \frac{S}{6abc} \times \frac{scb'}{r} + \frac{td \cdot b''}{r^2} + \frac{ue \cdot b'''}{r^3} + \&c. + \frac{S}{6abc} \times \frac{dsb'}{r} + \frac{et \cdot b''}{r^2} + \frac{fu \cdot b'''}{r^3} + \&c.$ Let k, δ, ϵ, ζ, &c. denote the number of persons living opposite the age of C in the table at the end of z, $z+1$, $z+2$, &c. years, β', β'', β''', &c. the decrements of life opposite the age of B at the end of those years respectively, π the probability that B dies after A, and C^{z} the value of an annuity on a life z years older than C; then will the value of S in the $z+1$st year (depending on the contingency of C's dying after B in that year, or of C's dying in that year, B having died after A in either of the foregoing z years) be expressed by $\frac{S \cdot k - \delta \cdot \beta}{2bcr^{z+1}} + \frac{\pi \cdot S \cdot k - \delta}{cr^{z+1}}$. In the $z+2$d, $z+3$d, &c. years, the payment of S will depend upon either

of three events: 1st, Of C's dying after B in that particular year. 2dly, Of C only dying in that year, B having died in either of the preceding $\overline{z+1}$, $\overline{z+2}$, &c. years: or, 3dly, Of C only dying in the year, B having died after A in the first z years. Hence the whole value of S, after the necessary extinction of the life of A by the table, will be $= \frac{S}{2bcr^{z}} \times \overline{\frac{k-\beta}{r} + \frac{\delta-1.\beta'}{r^2} + \frac{\epsilon-\zeta.\beta''}{r^3} + \&c.} + \frac{S}{bcr^{z+1}} \times \overline{\frac{\delta-1.\beta'}{r} + \frac{\epsilon-\zeta.\beta'+\beta''}{r^2} + \&c.} + \frac{S.\pi}{cr^{z}} \times \overline{\frac{k-\delta}{r} + \frac{\delta-\epsilon}{r^2} + \frac{\epsilon-\zeta}{r^3} + \&c.}$ The last of these series is $= \frac{S.\pi.k.\overline{r-1}}{cr^{z+1}} \times \overline{V-C^{z}}$; the other two series being added to the four first series in this solution, their sum will be found $= \frac{\overline{r-1}.\overline{V-C+BC}}{2r} + \frac{B'C'}{2r} - \frac{z.BK}{2c} + \frac{d}{2cr} \times \overline{T'-B'T'+1-BT}$ (T', B'T', and B'C' denoting the values of annuities on those single and joint lives respectively for z years.) The fifth and sixth series in the solution are $= \frac{az.HBK}{3ac} - \frac{AC}{2r} - \frac{\overline{r-1}.2V-ABC}{6r}$, the seventh and eighth series are $= \frac{a.\overline{HC-HBC}}{3a} + \frac{d}{6cr} \times \overline{AT-ABT}$, the ninth is $= \frac{s}{6ar} \times \overline{NC-NBC} - \frac{z}{6c} \times \overline{AK-ABK}$, and the tenth is $= \frac{ds}{6acr} \times \overline{1+NTB} - \frac{ABC}{6}$. Hence the whole value of the given sum in this case is $= S$ into $\frac{\overline{r-1}.\overline{V-L}}{6r} + \frac{B'C'-\overline{AC+C}}{2r} - \frac{z}{2c} \times \overline{BK + \frac{AK-ABK}{3}} + \frac{d}{2cr} \times \overline{\frac{AT-ABT}{3} + 1 + T' - BT + B'T'} + \frac{s}{6ar} \times \overline{NC-NBC} + \frac{d.\overline{1+NBT}}{c} + \frac{a}{3a} \times \overline{HC-HBC} + \frac{z.HBK}{c} + \frac{zk.\overline{r-1}}{cr^{z+1}} \times \overline{V-C^{z}}$.

When A is the oldest and C the youngest of the three lives, the

symbols c', c'', c''', &c. must be substituted for $\overline{c-d}$, $\overline{d-e}$, $\overline{e-f}$, &c. and the symbols $b-m$, $\overline{m-n}$, $\overline{n-o}$, &c. for b', b'', b''', &c. and the value of the given sum for the first z years, or during A's life, will be $= \frac{S}{6abc} \times \overline{\frac{abc'}{r} + \frac{smc''}{r^2} + \frac{tnc'''}{r^3} + \text{&c.}} - \frac{S}{6abc} \times \overline{\frac{bsc'}{r} + \frac{mtc''}{r^2} + \frac{nu \cdot c'''}{r^3} + \text{&c.}} + \frac{S}{3abc} \times \overline{\frac{amc'}{r} + \frac{snc''}{r^2} + \frac{toc'''}{r^3} + \text{&c.}} + \frac{S}{6abc} \times \overline{\frac{msc'}{r} + \frac{ntc''}{r^2} + \frac{ouc'''}{r^3} + \text{&c.}} + \frac{S}{2c} \times \overline{\frac{c'}{r} + \frac{c''}{r^2} + \frac{c'''}{r^3} + \ldots\ldots (z)} - \frac{S}{2ac} \times \overline{\frac{ac'}{r} + \frac{sc''}{r^2} + \frac{tc'''}{r^3} + \text{&c.}} - \frac{S}{2bc} \times \overline{\frac{mc'}{r} + \frac{nc''}{r^2} + \frac{oc'''}{r^3} + \text{&c.}\ldots\ldots (z)}$. Let p, μ, ν, ξ, &c. represent the number of persons living in the table opposite the age of B at the end of z, $\overline{z+1}$, $\overline{z+2}$, &c. years, and $\varkappa'$, $\varkappa''$, $\varkappa'''$, &c. the decrements of life opposite the age of C at the end of those years respectively; then, by reasoning as in the foregoing case, the value of S after the necessary extinction of the life of A will be $= \frac{S}{2bcr^z} \times \overline{\frac{\overline{p-\mu} \cdot \varkappa'}{r} + \frac{\overline{\mu-\nu} \cdot \varkappa''}{r^2} + \frac{\overline{\nu-\xi} \cdot \varkappa'''}{r^3} + \text{&c.}} + \frac{S}{bcr^{z+1}} \times \overline{\frac{\overline{p-\mu} \cdot \varkappa'}{r} + \frac{\overline{\mu-\nu} \cdot \varkappa''}{r^2} + \frac{\overline{\nu-\xi} \cdot \varkappa'''}{r^3} + \text{&c.}} + \frac{S \cdot \varpi}{cr^{z+1}} \times \overline{\frac{\varkappa'}{r} + \frac{\varkappa''}{r^2} + \frac{\varkappa'''}{r^3} + \text{&c.}}$ This last series is $= \frac{S \cdot \varpi \cdot k \cdot \overline{r-1}}{cr^{z+1}} \times \overline{V-C^z}$. The other two series may be resolved into $\frac{S \cdot p}{2br^z} \times \overline{\frac{\varkappa'}{r} + \frac{\varkappa''}{r^2} + \frac{\varkappa'''}{r^3} + \text{&c.}} - \frac{S}{2br^z} \times \overline{\frac{p\varkappa'}{r} + \frac{\mu\varkappa''}{r^2} + \frac{\nu\varkappa'''}{r^3} + \text{&c.}} - \frac{S}{2bcr^z} \times \overline{\frac{\mu\varkappa'}{r} + \frac{\nu\varkappa''}{r^2} + \frac{\xi\varkappa'''}{r^3} + \text{&c.}}$ The first of these is $= \frac{S \cdot p \cdot \overline{r-1}}{br^{z+1}} \times \overline{V-C^z}$; the second (supposing $F'C'$ to denote the value of the joint lives of F and C for z years) is $= \frac{\beta \cdot \overline{F_{\subset}-F'C'}}{2b} - \frac{\overline{B_{\subset}-b'c'}}{2r}$; the third is a continuation of the seventh series in this solution, and therefore the whole

of that series is $= \frac{BC}{2} - \frac{m \cdot \overline{1+PC}}{2br}$ . . . The first series in this solution is $= \frac{1+ABC}{6r} - \frac{\alpha\beta \cdot HFC}{6ab}$, the second is $= \frac{s}{6ar} \times \overline{NB - NBC} - \frac{\beta \cdot AF - AFC}{6b}$, the third is $= \frac{\alpha}{3a} \times \overline{HB - HBC} - \frac{m \cdot \overline{AP - APC}}{3br}$, the fourth is $= \frac{ms}{6abr} \times \overline{1 + NPC} - \frac{ABC}{6}$, the fifth is $= \frac{\overline{r-1} \cdot \overline{V - C}}{2r}$, and the sixth is $= \frac{\alpha \cdot HC}{2a} - \frac{1+AC}{2r}$. The whole value therefore of the given sum may be found $= S$. into $\frac{\overline{r-1}}{6r} \times \overline{V - 3C' + 3BC - ABC} + \frac{\overline{BC' - AC}}{2r} + \frac{\beta}{2b} \times \overline{FC - F'C'} - \frac{AF - AFC}{3} - \frac{\alpha \cdot HFC}{3a} + \frac{\alpha}{2a} \times \frac{2 \cdot \overline{HB - HBC}}{3} + HC + \frac{s}{6ar} \times \overline{NB - NBC} + \frac{m \cdot \overline{1+NPC}}{b} - \frac{m}{2br} \times \overline{1 + PC} + \frac{2 \cdot \overline{AP - APC}}{3} + \pi + \frac{k}{b} \times \frac{k \cdot \overline{r-1}}{cr^{n+1}} \times \overline{V - C}^n$.

When the lives are all equal, the expression $\frac{\beta s \cdot FK}{6bc}$ in the first and second rules becomes $= \frac{1+CC}{6r}$, the expression $\frac{md \cdot PT}{3ccr}$ becomes $= \frac{CC}{3} - \frac{dd}{3ccr}$, and the expression $\frac{C}{2r} - \frac{d \cdot T}{2cr}$, or $\frac{C'}{2r} - \frac{dT'}{2cr}$ becomes $= \frac{d}{2cr} - \frac{\overline{r-1} \cdot C}{2r}$, so that those rules become $= S$ into $\frac{\overline{r-1} \cdot \overline{V-L}}{6r} - \frac{s}{3c} \times \overline{CK - CCK} + \frac{d}{2cr} \times \overline{1 + \frac{CCT}{3}} - \frac{ss \cdot CKK}{6cc} - \frac{dd}{3ccr} \times \overline{1 + CTT}$. In the third rule the expressions $\frac{d}{2cr} \times \overline{T' - B'T'} - \frac{C' - B'C}{2r}$ become $= \frac{CC}{2r} - \frac{d}{2cr} \times \overline{1 - CT}$, so that in this case the value is $= S$ into $\frac{\overline{r-1} \cdot \overline{V-L}}{6r} + \frac{d}{3cr} \times \overline{CT - CCT} - \frac{s}{3c} \times \overline{CK + \frac{CCK}{2}} + \frac{ss \cdot CKK}{3cc} + \frac{dd}{6ccr} \times \overline{1 + CTT}$,

and by the fourth rule it becomes = S into $\frac{\overline{r-1}\,.\,\overline{V-L}}{6r} + \frac{n}{3c} \times \overline{2CK - \frac{CCK}{2} - \frac{n\,.\,CKK}{6cc} - \frac{d}{2cr} - \frac{d}{3cr} \times 2CT - \frac{CCT}{2} + \frac{dd}{6ccr} \times \overline{1 + CTT}}$. If the values of the joint lives in each of those rules be resolved into their respective series, all the expressions, except the first, will be found to destroy each other, and the general rule in all of them will become simply $= \frac{S\,.\,\overline{r-1}\,.\,\overline{V-L}}{6r}$, which from self-evident principles in this particular case, is known to be the true value. A similar result may likewise be immediately obtained from the series themselves; for the value of S for the first year is easily found in this case to be = $\frac{S}{r} \times \overline{\frac{1}{6} - \frac{d}{2c} + \frac{dd}{2cc} - \frac{d^3}{6c^3}}$, for the second year = $\frac{S}{r^2} \times \overline{\frac{ee}{2cc} - \frac{dd}{2cc} + \frac{d}{2c} - \frac{e}{2c} + \frac{d^3}{2c^3} - \frac{e^3}{2c^3}}$, for the third year = $\frac{S}{r^3} \times \overline{\frac{ff}{2cc} - \frac{ee}{2cc} + \frac{e}{2c} - \frac{f}{2c} + \frac{e^3}{2c^3} - \frac{f^3}{2c^3}}$, and so on for the other years. Hence the whole value is = $\frac{S\,.\,\overline{r-1}\,.\,\overline{V-L}}{6r}$ . . . . . Q. E. D.

It is to be observed, that the fractions $\frac{\overline{b-m}\,.\,\overline{d-e}\,.\,d}{2abcr^3}$, $\frac{\overline{b-n}\,.\,\overline{e-f}\,.\,\overline{d+d'}}{2abcr^3}$, &c. do not accurately express the value of S on the second contingency in this problem; but that according to the lemma they should have been $\frac{\overline{b-n}\,.\,\overline{d-e}\,.\,d}{2abcr^3}$, $\frac{\overline{b-n}\,.\,\overline{d+m-n}\,.\,\overline{d+d'} \times \overline{e-f}}{2abcr^3}$, &c. In order to determine how near the former * approach to the

* When B is the oldest these fractions are = $\frac{C' - A'C' - BC + ABC}{2r} + \frac{d}{2cr} \times \overline{BT - ABT - T' - A'T'}$. When A is the oldest they are = $\frac{C' - B'C' - AC + ABC}{2r} + \frac{d}{2cr} \times \overline{AT - ABT - T - BT}$.

true values, I have in the following examples undergone the labour of separately computing each of those latter fractions, and the results appear to differ so little from the approximated values, that I think a greater degree of accuracy need not be required.

Value of £ 100, *payable on the contingency in this problem, computed from the Northampton table, at* 4 per cent.

Ages of A.	Ages of B.	Ages of C.	Value by the rule.	Correct value.	Difference.
10	85	80	1.467	1.438	0.029
15	75	73	2.233	2.150	0.083
15	75	35	2.761	2.589	0.172
15	75	78	1.698	1.513	0.185
20	65	64	3.031	2.912	0.119
20	65	70	2.588	2.580	0.008
70	80	78	9.457	9.068	0.389
70	80	35	10.109	9.618	0.491

I have chosen those cases in which the approximation was likely to have been most inaccurate; for if the ages of A and B are either both younger, or differ less from each other than they do in these examples, it is obvious that the foregoing rules must be still nearer the truth. I have also uniformly supposed the life of B to be older than that of A, and of consequence the approximated value always errs in excess; if the life of A had been the older of the two, it would have been found to have erred in defect, and nearly to the same amount. But as, in this latter case, the value of the reversion is greater

than when B is the older life, the error must necessarily bear a less proportion to the whole value than it does in the preceding examples.

With regard to the fifth problem, the error in some cases is greater, in others less than in the present problem. If B and C are both older than A it will be nearly twice as great. If one is older and the other younger, it will be altogether inconsiderable; for the fractions which express the probability of the older of B and C dying after A will be as much above the truth, as the other fractions expressing the probability that the younger of these two lives die after A will be below it, and thus the errors of one correct those of the other, and render the computation almost perfectly accurate. I have not given any examples to that problem, not only as the correctness of its rules may be inferred from the examples which have been given to those of the present problem, but as I wished to make as few additions as possible to a paper, which having engaged a large portion of my time and attention for the last three years, has already become too long, and for which my only apology is the attempt to give correct, and not very laborious, solutions to some of the most difficult and complicated cases in the doctrine of survivorships.

XVIII. *Observation of the great Eclipse of the Sun of Sept. 5, 1793. By* John Jerome Schroeter, *Esq. Communicated by* George Best, *Esq. F. R. S.*

Read May 15, 1794.

Although the weather, owing to temporary clouds and flying showers, have at times been somewhat unfavourable, it was yet upon the whole sufficiently clear to admit of a good observation, to which the superiority of my instruments was not a little conducive.

Having prepared my hand telescope, being a 7-feet reflector, with a power magnifying 50 times with great distinctness, and with a field that took in more than the disk of the sun, I watched attentively for the first contact, but was prevented by some intervening clouds: the first glimpse, however, I had was immediately after the immersion, which took place at the north-west edge of the sun; and it was as yet so very trifling, that had it not been for the excellence of my instruments I should hardly have perceived it; and I am well assured that the first contact did not take place above 4 seconds before this instant of time. This observation was, according to true time, (corrected by 9 equal altitudes on the 4th and 6th) on the 5th Sept. at $10^h\ 26'\ 59''$, 3; so that the first contact must have been at $10^h\ 26'\ 55''$. The distance of the cusps I could not observe.

The end of the eclipse was, on the other hand, observed with

much more accuracy; for although the sun was at this time frequently covered by clouds of different densities, yet by means of a variety of glasses, which I applied occasionally to the eye-glass of my telescope, I was enabled to see distinctly the decreasing obscuration, which during the 3 last seconds was scarcely perceptible, although certainly still existing, the orb of the sun not being perfectly complete till after the expiration of the last-mentioned interval, which ended at $1^h\ 32'\ 54''$ true time. All these observations were made with the abovementioned 7-feet telescope, made by professor SCHRADER, magnifying 50 times.

During the intermediate period of the eclipse, the atmosphere being tolerably serene, I was enabled by the excellence of this telescope, and a large 13-feet reflector, to make a very interesting observation, which led to some important inferences.

1. All my telescopes, even the 3-feet achromatic, applied to my quadrant, shewed the globular body of the moon like a dusky grey orb floating before the sun, its faint light becoming somewhat brighter towards the rim.

2. Both myself, and several other persons who were then with me, perceived soon after the beginning of the eclipse three high ridges of mountains on the south-east border of the moon projecting sensibly into the disk of the sun; one of them appearing to be a long and considerable mountainous range, and the two others to the westward being more in the shape of prominent points. This was seen with the 7-feet reflector magnifying only 50 times, but this very distinctly: I applied a power of 160, together with the projection machine, and found that the two last-mentioned points were from 24 to 28 seconds asunder; that the long eastern range was somewhat

more distant from the nearest of the former, and that all of them projected, if not 4, at least 3 seconds beyond the rim of the moon; so that their height from the said rim could not be less than three-quarters of a German mile. It occurred to me that these probably were parts of the very high mountainous region *Doerfel* (*v.* Selen. Fragm. Tab. IV.); I delineated them, and compared them with my charts, and found that, though according to the present libration of the moon their projection ought not to be precisely as here represented, the coincidence was yet sufficiently striking.

Soon after, when the south-western limb of the moon had advanced a little further on the disk of the sun, I discovered on this part another equally prominent mountainous range, which I also measured and delineated. It consisted of a ridge one minute and from 30 to 40 seconds, and therefore not less than 23 or 24 geographical miles, in length; and four insulated mountains to the westward, all projecting from 2 to 3 seconds beyond the rim of the moon; these I had little doubt must be parts of the very lofty mountainous region *Leibnitz*, which a particular libration now presented in such a projection to our sight.

About noon, the eclipse being then at its greatest obscuration, I ventured to direct my excellent 13-feet reflector to the dim light of the sun; and now the dark orb of the moon, and its lofty mountainous rim to the southward, appeared with such uncommon, and in a manner palpable distinctness, that the impression of it can never be effaced from my imagination. I at the same time distinguished between these high ridges, other less ones, which however were equally well defined, but which I had not perceived with the 7-feet reflector; and

the contrast between several lofty ridges, and the smooth almost regular rim of the moon to the westward, was here sufficiently striking.

3. Not having for several days before, and likewise on the very day of the eclipse, noticed any spots on the disk of the sun, three small ones only excepted, which were perceived on the 29th of August; and it appearing very remarkable to me that, with this particular modification of the atmosphere of the sun, none of its blazing spots should be perceptible; I confess I was not a little surprised on viewing the sun's disk with my large reflector, to find that no, either dark or blazing, spots appeared on the luminous part, but that the whole visible disk was in a manner marbled, or covered over with whitish, more or less faint, nebulosities; as I had indeed seen it some years ago with my 7-feet HERSCHELIAN telescope, but by far not in so striking a degree. I at the same time discovered, westward towards the rim of the sun, a very small but distinct blackish spot, which other observers with inferior telescopes may well not have noticed, since I myself could not see it with my 7-feet SCHRADERIAN reflector. Some other observations I have made I shall reserve for the present.

Lilienthal,
Sept. 8, 1793.

XIX. *Experiments and Observations made with the Doubler of Electricity, with a view to determine its real Utility, in the investigation of the Electricity of atmospheric Air, in different degrees of Purity.* *By Mr.* John Read. *Communicated by* Richard Henry Alexander Bennet, *Esq. F. R. S.*

Read May 15, 1794.

It is scarcely necessary to observe, that having removed the uncertainty respecting the electrical action of this curious instrument, by demonstrating (after much care and pains, as is particularly expressed in my tract on Spontaneous Electricity) that the electricity of the doubler is alone derived from the common electrified aqueous vapour suspended in the air; I shall, without any further explanation, beg leave here to express my thoughts in terms according to that demonstration.

When I employ the doubler to investigate atmospheric electricity, I use it with its revolving plate uninsulated, when opposite to that fixed plate which is insulated; because, with respect to insulation, that position of the doubler exactly corresponds to the insulated and uninsulated parts of my high pointed rod, and of course their electrical accumulation will always be of the same kind in all weak electrifications of the atmosphere. To avoid repetition, permit me here also to mention, that care has been always taken to *clear* the doubler

of its former electric *charge*, before I proceeded to accumulate another.

Some observations which I made some time ago, induced me to suspect that air, by being vitiated even in a small degree in various ways, as by respiration, putrefaction, &c. lost a portion of its natural electricity, and became thereby electrified negatively: the following facts seem to substantiate this supposition. The room I usually inhabit being of small dimensions, is on that account more liable to suffer a change in the electrical state of its air than a larger one; and having been often struck with the constancy of the doubler charging negatively in it, whereas in the open air, and often in the adjoining room, which is larger, the doubler would give positive electricity; I saw nothing to occasion this difference between the two rooms besides what could be attributed to the respiration and to the usual effluvium of my body. I was therefore curious to try on the 9th of July, 1793, whether a change could be effected in the electrical state of the air in the large room by the same means. The weather being very hot and serene, therm. 75°, I invited a second person to sit with me in this room during the space of 20 or 30 minutes, with the door and windows close shut up; I placed myself nearly in the middle, and my companion at the side of the room. At the end of 20 minutes I was in a profuse perspiration, which according to my ideas must promote the business in hand; I therefore worked the doubler, and found the experiment to succeed agreeably to my expectation, as it now gave negative electricity.

Suspecting that similar effects must take place during sleep in my bed-room, which is on the north side of the house, I

examined the electric state of the air both within and without the bed-room a little before I went to rest, and found it positive by the doubler. I arose at six o'clock next morning, and worked the doubler, and it quickly became electrified negatively. But as it often happens, in completing one discovery we get an imperfect knowledge of others, I was surprised to observe, by the action of the doubler, to what a great degree the air in the room was deprived of its insulating quality; for although the doubler accumulated electricity in every revolution strong enough to enable me to ascertain its kind, yet its electric charge was conducted away almost as quickly as obtained.

With a view to determine what happens in the upper part of the house, I went up into the garret, and found it close shut up, and the air within it was excessively hot, and in some degree noxious; therm. 80°. After a very few turns of the revolving plate, the doubler became electrified negatively: I immediately set the door and windows wide open, and another door which opens over a bow window, to let in fresh air; but the wind blowing moderately strong from the east, and the bow window door being at the north end, and the windows at the south end of the garret, made it unfavourable for an east wind to drive through it, therefore its electric state remained the same in kind after they had been opened, as when shut; for I examined it at several intervals of time: yet the state of the air became thereby considerably better to breathe in. These facts will appear still more extraordinary, when we consider that the general state of atmospheric electricity at the time of performing these experiments was of the positive kind, as appeared by the doubler when placed on the wood hand-rail of the bow window, which is only three

feet and six inches out of the garret. Had the direction of the wind been north or south, it would have passed through the garret with force, and would, no doubt, have changed by regular gradation its electricity to positive; a fact that I have often observed to succeed very quickly.

I likewise observed, that when the excessive heat of the sun was full upon any other room in my house, it was capable of effecting a change in their electrical state, excepting in those which were under ground; for in the two kitchens, open area, and coal-vault, the doubler became electrified positively; in the two former rooms speedily, but in the two latter, that lay more to the sun, slowly. I have observed before, that the air in the garret was infected with a noxious exhalation, which I now judge came from the wearing apparel laid up in it: whereas the air in the kitchens was not only much cooler, but perfectly clear of all offensive exhalations. However, on the 17th of July, the two kitchens were white-washed and painted, and of course were filled with a noxious effluvium. The day after, I worked the doubler in the kitchens, and by a very few turns of the revolving plate it gave negative electricity.

Knightsbridge charity-school fills up a piece of ground between the north end of the chapel and Hyde-Park wall; and the main sewer of that neighbourhood runs at no great depth under it; the number of children educated in this school is thought by some to be too great for the size of the school; on these accounts it becomes infected with a very disagreeable stench, especially when the door and windows are shut up; I have sometimes found the noxious effluvium so very strong in this school, that I have hastened out to breathe a purer air. I have often examined the electrical state of the air in this

school with the doubler, and have always found it strongly negative; which shewed that the aqueous or other conducting matter lodged in the air of the school, possessed less than their natural quantity of electricity; while that of the schoolmaster's parlour adjoining, having nobody in it, possessed somewhat more than its natural quantity, it was found therefore positively electrified.

July 5th, therm. 76°, I went to the school, and found the door and windows set wide open to let in cool air; I now perceived no stench at all in the school, and thought it needless to try it. However the schoolmaster observed that the further end of the school was at all times most infected with, and seldom quite clear of stench. I therefore worked the doubler in that part of it, and after a very few turns it became electrified negatively, rather against my expectation. I then tried the other end of the school, which, by the door being wide open, was less liable to retain any noxious effluvium, and there the doubler gave positive electricity. After this I tried it in the schoolmaster's parlour, where it was positive also.

July 30th, I had the curiosity to examine with the doubler the electrical state of the air in the wards of the Lock Hospital. In the two small men's wards it was found negative in every part. The floor of the large or long ward had been washed, and the boards were still wet; the windows in the east side, and the large one in the south end, were all open; therefore there was but very little offensive smell in the south end of this ward, and here the doubler became electrified positively: but the great window in the north end of this ward being close shut up, caused a sensible closeness in the air, accompanied with a slight smell; and in this end of the ward the doubler

gave negative electricity. The door and all the windows in the women's long ward were set wide open; the open windows at each end of this ward being nearly in the direction of the wind, gave it a complete passage through it; of course, the wind blowing at that time with a brisk gale, ventilated this ward completely, for there was no offensive smell in it; however, I tried the state of the air in several parts of it with the doubler, in all of which it gave positive electricity, the same as it would have done in the open air on the outside of the building.

December 6th, I observed in the garden a heap of the loppings and leaves of shrubs, in a state of putrefaction, which induced me to examine their volatile effluvium with the doubler, which I placed upon the heap, and on working it, it became possessed of a weak negative electricity; for it required more than thirty turns of the revolving plate to effect a good charge, whereas in the privy (which is at a small distance from the heap of leaves) the doubler became strongly charged with less than half that number of turns, and with the same kind of electricity. This, indeed, I expected would have been the case, because I have always observed the doubler to give negative electricity in a privy; but that the rotten leaves should be able to maintain that electric state in the open air, is truly wonderful, when it is considered that the surrounding atmospherical electricity was of the positive kind, and rather strongly so, both by the doubler and the high pointed rod. I am of opinion that I should not have given due attention to this fact, if it had not so happened that the doubler had not been used for near two weeks before; it was therefore evident, that it

must have been wholly deprived of every particle of its former charge.

The day after this, the heap of leaves was laid open, and every twig and leaf exhibited a covering of white mould; but after this, the doubler always gave the same kind of electricity when worked on the leaves, as in any other part of the open air, namely, positive. In order to be fully satisfied in this matter I determined to try it on a large dunghill, whence a greater quantity of putrid effluvium must ascend. I also resolved to make the experiment when the air was sharp and frosty, because then the atmospheric electricity is not only of the positive kind, but uniformly the same in all places, from the surface of uncontaminated earth to any height we can go. The weather on the first day of January, 1794, was quite such as I desired for this business, that is, it was frosty, and accompanied with a very slight dry fog, therm. 31°.

I conjectured that Mr. TATTERSALL (a dealer in horses in my neighbourhood) might be possessed of a large dunghill; I therefore went to his house, and was taken into his garden, where there was a great quantity of it. I first went upon the highest part of the dunghill, and held the doubler in one hand a little above the dung, yet within the reach of the ascending pale coloured vapour, and with the other I turned the revolving plate five or six times, by which means the doubler became electrified positively; which was known to be at that time the general electrical state of the atmosphere. The doubler was now lowered, and placed upon the dung; and here also it became charged by a few turns of the revolving plate, which made me suspect that I had not completely cleared the doubler

of its former charge; however, on trial it was found to be electrified negatively. This remarkable fact fully satisfied me that I had not deceived myself in the first experiment on the heap of leaves above mentioned.

I repeated these experiments, with the doubler placed on various parts of the dunghill, without any remarkable variation in the results, except that the negative state of the exhaled vapour was stronger, and extended to a greater distance, in the depressed or hollow parts of the dung, where the vapour was less exposed to a moderate gale of wind that then prevailed, than on the open parts which lay full to it. I have reason to be of opinion, that the negative state of the vapour on the windward side of the dung did not reach so high as the revolving plate of the doubler when turned up, so that in every revolution it must pass through electrified and neutral vapour, which required in those situations from thirty to forty revolutions to obtain a small charge. From this circumstance I am inclined to think that if a doubler were made of very small dimensions, and placed in the neutral space between the two electric powers, it would be impossible to accumulate with it any spontaneous electricity.

I was solicited to try the state of the air in the hot-house with the doubler, to which I very readily consented. I found the air in it agreeably warm, and full of moisture, which was condensed on the glass roof, and fell down in large drops. The doubler also, having been long exposed in frosty air, quickly attracted and condensed the humid particles upon itself, so as to form a coating on all its parts. I therefore hastened to make the experiment; yet under all these unfavourable circumstances the doubler became electrified negatively after about

fourteen revolutions. As I perceived no smell in this close hot-house, I am inclined to attribute the negative electric state of the vapour to the heat of the fire and vigour of the plants, which possibly may absorb the fluid faster than it could get in through the floor, which is rendered very dry by flues that lie on three sides of it.

Without even attempting to consider in this place how far the influence of electricity is concerned in all sorts of vitiated air, it will be sufficient to remark, as it clearly follows from the preceding experiments, that air infected with animal respiration, or vegetable putrefaction, is always electrified negatively, when at the same time the surrounding atmosphere is electrified positively.

XX. *Tables for reducing the Quantities by Weight, in any Mixture of pure Spirit and Water, to those by Measure; and for determining the Proportion, by Measure, of each of the two Substances in such Mixtures. By Mr.* George Gilpin, *Clerk to the Royal Society. Communicated by Sir* Charles Blagden, *Knt. Sec. R. S.*

Read June 19th, 1794.

THESE tables are founded on the experiments of which the results were given in the Report and Supplementary Report on the best method of proportioning the excise on spirituous liquors. They are computed for every degree of heat from 30° to 80°, and for the addition or subtraction of every one part in a hundred of water or spirit; but as the experiments themselves were made only to every fifth degree of heat, and every five in the hundred of water or spirit, the intermediate places are filled up by interpolation in the usual manner, with allowance for second differences.

Every table consists of eight columns, and there are two tables for every degree of heat. In the first column of the *first* of the two tables, are given the proportions of spirit and water by weight, 100 parts of spirit being taken as the constant number, to which additions are made successively of one part of water from 1 to 99 inclusively. The first column in the *second* table has 100 parts of water for the constant number, with the parts of spirit decreasing successively by unity, from

100 to 1 inclusively. It must be observed, that each of these tables occupying one page, is divided in the middle for adapting it more conveniently to the size of the paper; but the whole of each page is to be considered as one continued table. The second column of all the tables gives the specific gravities of the corresponding mixtures of spirit and water in the first column, taken from the table of specific gravities in the Supplementary Report, the intermediate spaces being filled up by interpolation. In the third column 100 parts by measure of pure spirit, at the temperature marked on the top of every separate table, is assumed as the constant standard number, to which the respective quantities of water by measure, at the same temperature, are to be proportioned in the next column. The fourth column, therefore, contains the proportion of water by measure, to 100 measures of spirit, answering to the proportions by weight in the same horizontal line of the first column. The fifth column shews the number of parts which the quantities of spirit and water contained in the third and fourth columns would measure when the mixture has been completed; that is, the bulk of the whole mixture after the concentration, or mutual penetration, has fully taken place. The sixth column, deduced from the three preceding ones, gives the effect of that concentration, or how much smaller the volume of the whole mixture is, than it would be if there was no such principle as the mutual penetration. The seventh column shews the quantity of pure spirit by measure, at the temperature in the table, contained in 100 measures of the mixture laid down in the fifth column. Lastly, the eighth column gives the decimal multiplier, by means of which the quantity by measure of standard pure spirit, of ,825 specific gravity at

60° of heat, may at once be ascertained, the temperature and specific gravity of the liquor being given; pursuant to the idea suggested in the Report, that "the simplest and most equitable "method of levying the duty on spirituous liquors would be, "to consider rectified spirit as the true and only excisable "matter."

It may be proper to add a short account of the method pursued in computing some of the columns of these tables. Columns I. II. and III. require no other explanation than has been already given. Col. IV. is obtained thus: divide the specific gravity of the pure spirit, at the temperature in the table, by the specific gravity of water at the same temperature: then, for the *first* of the two tables for each degree of heat, the proportion is, as 100 is to the quantity of water by weight in the first column, so is the quotient of the abovementioned division to the quantity of water by measure sought; for the *second* of the two tables the proportion is, as the quantity of spirit by weight in the first column is to 100, so is that same quotient to the quantity of water by measure sought.

Col. V. requires more calculation. The first step is to compute what the specific gravity of the mixture in question would be if no concentration took place; to obtain which, the constant number 100 (indicating the quantity by measure) of pure spirit, is to be multiplied by the specific gravity of pure spirit at the temperature in the table, and the corresponding measure of water in the fourth column is also to be multiplied by its specific gravity at the given temperature; these two products being added together, their sum is to be divided by the sum of the absolute quantities of spirit and water by measure in the same horizontal line of the third and fourth columns:

then the proportion is, as this quotient (or what the specific gravity would be without concentration) is to the real specific gravity as found in the same horizontal line of the second column of the table, so is the sum of the quantities of spirit and water in the third and fourth columns inversely to the bulk of the mixture.

Col. VI. is obtained by subtracting the real bulk of the mixture in col. V. from the sum of the quantities of spirit and water in col. III. and IV. the difference between them being the diminution occasioned by the concentration on that whole quantity. Col. VII. is obviously to be computed by the following proportion: as the bulk of the whole quantity of the mixture in col. V. is to 100 (the constant quantity), so is 100 to the quantity of pure spirit *per cent.* at the temperature of the table. Col. VIII. is formed by reducing the volume of the spirit *per cent.* at the temperature of the table, to its volume at 60°, by the following proportion: as ,825 (the specific gravity of pure spirit at 60°) is to its specific gravity at the given temperature, so is the number in the seventh column to the volume of pure spirit, at 60° of heat, contained in 100 parts by measure of the mixture at the temperature of the table: this divided by 100 is the decimal multiplier sought; the product of which into any measure of a spirituous liquor of the corresponding specific gravity and temperature, will be the true quantity of standard pure spirit, at 60° of heat, contained in that liquor.

It may very probably be thought right, for the future use of the revenue, to compute another set of tables, in which the degree of heat standing at the head of each table, the first column of it shall be even numbers of specific gravity. This would be proper for looking out at once the quantities of spirit

and water in a mixture, from its heat and specific gravity, as immediately determined by experiment. For scientific purposes also, tables should be constructed to shew the regular increments and decrements of the concentration, by equal variations in the proportions of spirit and water: but these, and others of a similar nature, which might be suggested, do not belong to the present subject. C. B.

TABLE I. HEAT 30°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83896	100	—	100,00	—	100,00	1,0169
1	,84129	—	0,84	100,72	0,12	99,28	1,0096
2	,84355	—	1,68	101,45	0,23	98,57	1,0024
3	,84575	—	2,51	102,18	0,33	97,87	,9953
4	,84788	—	3,35	102,91	0,44	97,18	,9882
100 + 5	,84995	—	4,19	103,64	0,55	96,49	,9812
6	,85197	—	5,03	104,38	0,65	95,80	,9743
7	,85394	—	5,87	105,12	0,75	95,13	,9674
8	,85586	—	6,71	105,87	0,84	94,46	,9606
9	,85773	—	7,54	106,61	0,93	93,80	,9539
100 + 10	,85957	—	8,38	107,36	1,02	93,14	,9472
11	,86138	—	9,22	108,11	1,11	92,50	,9406
12	,86316	—	10,06	108,86	1,20	91,86	,9341
13	,86490	—	10,90	109,61	1,29	91,23	,9277
14	,86660	—	11,73	110,37	1,36	90,61	,9214
100 + 15	,86825	—	12,57	111,12	1,45	89,99	,9151
16	,86984	—	13,41	111,87	1,54	89,38	,9089
17	,87139	—	14,25	112,63	1,62	88,77	,9028
18	,87291	—	15,09	113,39	1,70	88,17	,8967
19	,87440	—	15,93	114,15	1,78	87,58	,8907
100 + 20	,87585	—	16,77	114,91	1,86	87,00	,8847
21	,87729	—	17,60	115,67	1,93	86,42	,8788
22	,87871	—	18,44	116,44	2,00	85,85	,8730
23	,88010	—	19,28	117,21	2,07	85,29	,8673
24	,88147	—	20,12	117,98	2.14	84,73	,8616
100 + 25	,88282	—	20,96	118,75	2,21	84,18	,8560
26	,88414	—	21,80	119,53	2,27	83,64	,8505
27	,88544	—	22,63	120,31	2,32	83,10	,8451
28	,88672	—	23,47	121,09	2,38	82,57	,8397
29	,88797	—	24,31	121,87	2,44	82,05	,8344
100 + 30	,88921	—	25,15	122,05	2,50	81,53	,8291
31	,89043	—	25,99	123,43	2,56	81,02	,8239
32	,89163	—	26,83	124,21	2,62	80,51	,8188
33	,89281	—	27,66	124,98	2,68	80,01	,8137
34	,89397	—	28,50	125,76	2,74	79,52	,8087
100 + 35	,89511	—	29,34	126,53	2,81	79,03	,8037
36	,89623	—	30,18	127,31	2,87	78,55	,7988
37	,89733	—	31,02	128,09	2,93	78,07	,7939
3	,89842	—	31,86	128,87	2,99	77,60	,7891
39	,89949	—	32,69	129,65	3,04	77,13	,7844
100 + 40	,90054	—	33,54	130,43	3,11	76,67	,7797
41	,90158	—	34,38	131,21	3,17	76,21	,7751
42	,90260	—	35,22	131,99	3,23	75,76	,7705
43	,90361	—	30,05	132,77	3,28	75,32	,7660
44	,90460	—	36,89	133,55	3,34	74,88	,7615
100 + 45	,90558	—	37,72	134,33	3,39	74,44	,7570
46	,90654	—	38,56	135,12	3,44	74,01	,7526
47	,90749	—	39,40	135,90	3,50	73,58	,7483
48	,90842	—	40,24	136,69	3,55	73,16	,7440
49	,90933	—	41,08	137,47	3,61	72,74	,7397

I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,91023	100	41,92	138,26	3,66	72,33	,7355
51	,91111	—	42,75	139,04	3,71	71,92	,7314
52	,91197	—	43,59	139,83	3,76	71,51	,7273
53	,91282	—	44,43	140,62	3,81	71,11	,7232
54	,91366	—	45,27	141,41	3,86	70,72	,7191
100 + 55	,91449	—	46,11	142,20	3,91	70,33	,7151
56	,91531	—	46,95	142,99	3,96	69,94	,7112
57	,91612	—	47,78	143,78	4,00	69,55	,7073
58	,91691	—	48,62	144,57	4,05	69,17	,7034
59	,91770	—	49,46	145,36	4,10	68,80	,6996
100 + 60	,91847	—	50,30	146,15	4,15	68,42	,6958
61	,91923	—	51,14	146,94	4,20	68,05	,6920
62	,91998	—	51,98	147,73	4,25	67,69	,6883
63	,92072	—	52,81	148,52	4,29	67,33	,6846
64	,92145	—	53,65	149,32	4,33	66,97	,6810
100 + 65	,92217	—	54,49	150,11	4,38	66,62	,6774
66	,92288	—	55,33	150,90	4,43	66,27	,6739
67	,92358	—	56,17	151,70	4,47	65,92	,6704
68	,92427	—	57,01	152,49	4,52	65,58	,6669
69	,92496	—	57,84	153,29	4,55	65,24	,6634
100 + 70	,92563	—	58,68	154,08	4,60	64,90	,6600
71	,92629	—	59,52	154,88	4,64	64,57	,6566
72	,92694	—	60,36	155,67	4,69	64,24	,6532
73	,92758	—	61,20	156,47	4,73	63,91	,6499
74	,92821	—	62,04	157,26	4,78	63,59	,6466
100 + 75	,92889	—	62,87	158,06	4,81	63,27	,6434
76	,92951	—	63,71	158,85	4,86	62,95	,6402
77	,93012	—	64,55	159,65	4,90	62,63	,6370
78	,93078	—	65,39	160,45	4,94	62,32	,6338
79	,93132	—	66,23	161,25	4,98	62,02	,6306
100 + 80	,93191	—	67,07	162,05	5,02	61,71	,6275
81	,93249	—	67,90	162,84	5,06	61,41	,6244
82	,93306	—	68,74	163,64	5,10	61,11	,6214
83	,93363	—	69,58	164,44	5,14	60,81	,6184
84	,93419	—	70,42	165,24	5,18	60,52	,6154
100 + 85	,93474	—	71,26	166,04	5,22	60,22	,6124
86	,93529	—	72,10	166,84	5,26	59,94	,6095
87	,93583	—	72,93	167,64	5,29	59,65	,6066
88	,93636	—	73,77	168,44	5,33	59,37	,6037
89	,93689	—	74,61	169,24	5,37	59,09	,6008
100 + 90	,93741	—	75,45	170,04	5,41	58,81	,5980
91	,93792	—	76,29	170,85	5,44	58,53	,5952
92	93843	—	77,13	171,65	5,48	58,26	,5924
93	,93893	—	77,96	172,45	5,51	57,99	,5897
94	,93942	—	78,80	173,25	5,55	57,72	,5870
100 + 95	,93991	—	79,64	174,05	5,59	57,45	,5843
96	,94038	—	80,47	174,85	5,62	57,19	,5816
97	,94085	—	81,30	175,65	5,65	56,93	,5790
98	,94131	—	82,14	176,46	5,68	56,67	,5763
99	,94177	—	82,98	177,27	5,71	56,41	,5736

TABLE II. HEAT 30°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,94222	100	83,83	178,08	5,75	56,15	,5710
99	,94267	—	84,69	178,90	5,79	55,89	,5684
98	,94312	—	85,55	179,74	5,81	55,63	,5658
97	,94357	—	86,43	180,59	5,84	55,37	,5631
96	,94402	—	87,33	181,45	5,88	55,11	,5604
100 + 95	,94447	—	88,25	182,33	5,92	54,84	,5577
94	,94492	—	89,18	183,24	5,94	54,57	,5550
93	,94537	—	90,14	184,17	5,97	54,30	,5522
92	,94583	—	91,12	185,12	6,00	54,02	,5494
91	,94629	—	92,13	186,09	6,04	53,74	,5465
100 + 90	,94675	—	93,15	187,08	6,07	53,45	,5436
89	,94723	—	94,19	188,09	6,10	53,17	,5407
88	,94771	—	95,26	189,12	6,14	52,88	,5377
87	,94821	—	96,36	190,18	6,18	52,58	,5347
86	,94870	—	97,48	191,26	6,22	52,28	,5317
100 + 85	,94920	—	98,63	192,37	6,26	51,98	,5286
84	,94970	—	99,80	193,51	6,29	51,68	,5255
83	,95021	—	101,00	194,67	6,33	51,37	,5224
82	,95071	—	102,24	195,86	6,38	51,06	,5192
81	,95122	—	103,50	197,09	6,41	50,74	,5160
100 + 80	,95173	—	104,79	198,34	6,45	50,42	,5127
79	,95224	—	106,12	199,62	6,50	50,09	,5094
78	,95275	—	107,48	200,95	6,53	49,76	,5060
77	,95327	—	108,88	202,31	6,57	49,43	,5026
76	,95378	—	110,31	203,70	6,61	49,09	,4992
100 + 75	,95429	—	111,78	205,13	6,65	48,75	,4957
74	,95479	—	113,29	206,61	6,68	48,40	,4922
73	,95529	—	114,84	208,13	6,71	48,05	,4886
72	,95580	—	116,44	209,69	6,75	47,69	,4850
71	,95630	—	118,08	211,29	6,79	47,33	,4813
100 + 70	,95681	—	119,76	212,94	6,82	46,96	,4775
69	,95733	—	121,49	214,64	6,85	46,59	,4738
68	,95786	—	123,28	216,39	6,89	46,21	,4700
67	,95838	—	126,12	218,19	6,93	45,83	,4661
66	,95891	—	127,02	220,05	6,97	45,44	,4621
100 + 65	,95944	—	128,98	221,97	7,01	45,05	,4581
64	,95997	—	130,99	223,95	7,04	44,65	,4541
63	,96050	—	133,06	225,99	7,07	44,25	,4500
62	,96103	—	135,21	228,10	7,11	43,84	,4458
61	,96156	—	137,43	230,28	7,15	43,43	,4416
100 + 60	,96209	—	139,72	232,54	7,18	43,00	,4373
59	,96262	—	142,08	234,87	7,21	42,58	,4330
58	,96314	—	144,53	237,29	7,24	42,14	,4286
57	,96367	—	147,07	239,80	7,27	41,70	,4241
56	,96418	—	149,70	242,40	7,30	41,25	,4195
100 + 55	,96470	—	152,42	245,09	7,33	40,80	,4149
54	,96520	—	155,22	247,87	7,35	40,34	,4102
53	,96570	—	158,14	250,77	7,37	39,87	,4054
52	,96620	—	161,19	253,79	7,40	39,40	,4006
51	,96670	—	164,36	256,92	7,44	38,92	,3957

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96719	100	167,67	260,19	7,48	38,43	,3908
49	,96769	—	171,09	263,03	7,46	37,93	,3858
48	,96819	—	174,65	267,18	7,47	37,43	,3806
47	,96869	—	178,37	270,89	7,48	36,92	,3754
46	,96919	—	182,25	274,75	7,50	36,40	,3701
100 + 45	,96967	—	186,30	278,79	7,51	35,87	,3648
44	,97015	—	190,53	283,02	7,51	35,33	,3593
43	,97062	—	194,96	287,46	7,50	34,79	,3538
42	,97109	—	199,60	292,11	7,49	34,23	,3482
41	,97155	—	204,47	296,98	7,49	33,67	,3424
100 + 40	,97200	—	209,58	302,12	7,46	33,10	,3366
39	,97244	—	214,96	307,49	7,47	32,52	,3307
38	,97288	—	220,62	313,17	7,45	31,94	,3247
37	,97332	—	226,58	319,17	7,41	31,34	,3186
36	,97375	—	232,87	325,51	7,36	30,73	,3124
100 + 35	,97418	—	239,53	332,18	7,35	30,11	,3061
34	,97461	—	246,57	339,26	7,31	29,48	,2997
33	,97504	—	254,04	346,79	7,25	28,84	,2932
32	,97548	—	261,98	354,79	7,19	28,19	,2866
31	,97591	—	270,43	363,29	7,14	27,53	,2799
100 + 30	,97635	—	279,44	372,36	7,08	26,86	,2731
29	,97679	—	289,08	382,04	7,04	26,17	,2662
28	,97723	—	299,41	392,43	6,98	25,48	,2591
27	,97768	—	310,50	403,60	6,90	24,78	,2519
26	,97814	—	322,44	415,63	6,81	24,06	,2446
100 + 25	,97860	—	335,34	428,65	6,69	23,33	,2372
24	,97906	—	349,31	442,73	6,58	22,59	,2297
23	,97954	—	364,49	458,03	6,46	21,83	,2220
22	,98004	—	381,06	474,72	6,34	21,06	,2142
21	,98055	—	399,21	492,99	6,22	20,28	,2063
100 + 20	,98108	—	419,17	513,08	6,09	19,49	,1982
19	,98163	—	441,23	535,29	5,94	18,68	,1900
18	,98221	—	465,74	559,95	5,79	17,86	,1816
17	,98282	—	493,14	587,50	5,64	17,02	,1731
16	,98345	—	523,96	618,48	5,48	16,17	,1644
100 + 15	,98412	—	558,89	653,58	5,31	15,30	,1556
14	,98481	—	598,81	693,69	5,12	14,41	,1466
13	,98555	—	644,88	739,94	4,94	13,51	,1375
12	,98633	—	698,62	793,88	4,74	12,59	,1281
11	,98716	—	762,13	857,59	4,54	11,66	,1186
100 + 10	,98804	—	838,34	934,04	4,30	10,71	,1089
9	,98896	—	931,49	1027,42	4,07	9,73	,0990
8	,98995	—	1047,92	1144,10	3,82	8,74	,0889
7	,99101	—	1197,63	1294,05	3,58	7,73	,0786
6	,99214	—	1397,23	1493,91	3,32	6,69	,0681
100 + 5	,99334	—	1070,08	1773,63	3,05	5,64	,0573
4	,99463	—	2095,85	2193,08	2,77	4,56	,0464
3	,99602	—	2794,46	2891,94	2,52	3,46	,0352
2	,99751	—	4191,71	4289,38	2,33	2,33	,0237
1	,99910	—	8383,40	8481,13	2,27	1,18	,0120

TABLE I. HEAT 31°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83852	100	—	100,00	—	100,00	1,0164
1	,84084	—	0,84	100,72	0,12	99,28	1,0091
2	,84310	—	1,68	101,45	0,23	98,57	1,0019
3	,84530	—	2,51	102,18	0,33	97,87	,9948
4	,84743	—	3,35	102,91	0,44	97,18	,9877
100 + 5	,84950	—	4,19	103,64	0,55	96,49	,9807
6	,85152	—	5,03	104,38	0,65	95,80	,9738
7	,85349	—	5,87	105,12	0,75	95,13	,9669
8	,85541	—	6,71	105,87	0,84	94,46	,9601
9	,85728	—	7,54	106,61	0,93	93,80	,9534
100 + 10	,85911	—	8,38	107,36	1,02	93,14	,9467
11	,86092	—	9,22	108,11	1,11	92,50	,9401
12	,86270	—	10,05	108,86	1,19	91,86	,9336
13	,86443	—	10,89	109,61	1,28	91,23	,9272
14	,86613	—	11,72	110,37	1,35	90,61	,9209
100 + 15	,86778	—	12,56	111,12	1,44	89,99	,9146
16	,86937	—	13,41	111,88	1,53	89,38	,9084
17	,87092	—	14,24	112,63	1,61	88,77	,9023
18	,87244	—	15,08	113,39	1,69	88,17	,8963
19	,87394	—	15,92	114,15	1,77	87,58	,8903
100 + 20	,87539	—	16,76	114,91	1,85	87,00	,8842
21	,87683	—	17,59	115,68	1,91	86,42	,8784
22	,87826	—	18,43	116,45	1,98	85,85	,8726
23	,87966	—	19,27	117,21	2,06	85,29	,8669
24	,88103	—	20,11	117,98	2,13	84,73	,8612
100 + 25	,88238	—	20,95	118,75	2,20	84,18	,8556
26	,88370	—	21,79	119,53	2,26	83,64	,8501
27	,88500	—	22,62	120,31	2,31	83,10	,8447
28	,88628	—	23,46	121,09	2,37	82,57	,8393
29	,88753	—	24,30	121,87	2,43	82,05	,8340
100 + 30	,88877	—	25,14	122,65	2,49	81,53	,8287
31	,88999	—	25,97	123,42	2,55	81,02	,8235
32	,89120	—	26,81	124,20	2,61	80,51	,8184
33	,89238	—	27,65	124,97	2,68	80,01	,8133
34	,89354	—	28,48	125,75	2,73	79,52	,8083
100 + 35	,89468	—	29,32	126,52	2,80	79,03	,8033
36	,89580	—	30,16	127,30	2,86	78,55	,7984
37	,89690	—	31,00	128,08	2,92	78,07	,7936
38	,89799	—	31,84	128,86	2,98	77,60	,7887
39	,89906	—	32,67	129,64	3,03	77,13	,7841
100 + 40	,90011	—	33,52	130,42	3,10	76,67	,7793
41	,90115	—	34,36	131,20	3,16	76,21	,7748
42	,90218	—	35,19	131,98	3,21	75,76	,7702
43	,90319	—	36,03	132,76	3,27	75,32	,7657
44	,90418	—	36,86	133,54	3,32	74,88	,7612
100 + 45	,90516	—	37,70	134,32	3,38	74,45	,7567
46	,90612	—	38,53	135,11	3,42	74,01	,7523
47	,90707	—	39,37	135,89	3,48	73,59	,7480
48	,90800	—	40,21	136,68	3,53	73,17	,7437
49	,90891	—	41,06	137,46	3,60	72,74	,7394

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90980	100	41,90	138,25	3,65	72,33	,7352
51	,91069	—	42,72	139,03	3,69	71,92	,7311
52	,91155	—	43,57	139,82	3,75	71,51	,7270
53	,91241	—	44,40	140,61	3,79	71,12	,7229
54	,91325	—	45,24	141,40	3,84	70,72	,7188
100 + 55	,91408	—	46,08	142,18	3,90	70,33	,7148
56	,91490	—	46,92	142,97	3,95	69,94	,7109
57	,91571	—	47,75	143,76	3,99	69,56	,7070
58	,91650	—	48,59	144,55	4,04	69,18	,7031
59	,91729	—	49,43	145,34	4,09	68,80	,6993
100 + 60	,91806	—	50,27	146,13	4,14	68,43	,6955
61	,91882	—	51,11	146,92	4,19	68,06	,6917
62	,91957	—	51,95	147,71	4,24	67,69	,6880
63	,92031	—	52,78	148,50	4,28	67,34	,6843
64	,92104	—	53,62	149,30	4,32	66,98	,6807
100 + 65	,92176	—	54,46	150,09	4,37	66,63	,6771
66	,92247	—	55,29	150,88	4,41	66,28	,6736
67	,92317	—	56,14	151,68	4,46	65,92	,6701
68	,92386	—	56,97	152,47	4,50	65,58	,6666
69	,92455	—	57,80	153,27	4,53	65,24	,6631
100 + 70	,92522	—	58,64	154,06	4,58	64,91	,6597
71	,92588	—	59,48	154,86	4,62	64,57	,6563
72	,92653	—	60,32	155,66	4,66	64,24	,6530
73	,92717	—	61,16	156,46	4,70	63,91	,6497
74	,92780	—	62,00	157,25	4,75	63,59	,6464
100 + 75	,92848	—	62,83	158,04	4,79	63,27	,6431
76	,92910	—	63,67	158,83	4,84	62,96	,6399
77	,92971	—	64,51	159,64	4,87	62,63	,6367
78	,93036	—	65,35	160,43	4,92	62,33	,6335
79	,93091	—	66,19	161,23	4,96	62,02	,6303
100 + 80	,93150	—	67,03	162,03	5,00	61,72	,6273
81	,93209	—	67,86	162,82	5,04	61,41	,6242
82	,93266	—	68,70	163,62	5,08	61,12	,6212
83	,93323	—	69,54	164,42	5,12	60,81	,6182
84	,93379	—	70,38	165,22	5,16	60,52	,6151
100 + 85	,93434	—	71,22	166,03	5,19	60,23	,6122
86	,93489	—	72,05	166,83	5,22	59,95	,6093
87	,93543	—	72,89	167,63	5,26	59,66	,6064
88	,93596	—	73,72	168,43	5,29	59,37	,6035
89	,93649	—	74,56	169,23	5,33	59,09	,6006
100 + 90	,93701	—	75,40	170,03	5,37	58,82	,5978
91	,93752	—	76,24	170,83	5,41	58,53	,5950
92	,93802	—	77,08	171,63	5,45	58,27	,5922
93	,93852	—	77,91	172,43	5,48	58,00	,5895
94	,93901	—	78,75	173,24	5,51	57,73	,5868
100 + 95	,93950	—	79,59	174,03	5,56	57,46	,5841
96	,93998	—	80,42	174,84	5,58	57,20	,5814
97	,94045	—	81,25	175,64	5,61	56,93	,5788
98	,94092	—	82,09	176,44	5,65	56,67	,5761
99	,94138	—	82,93	177,25	5,68	56,42	,5734

TABLE II.

HEAT 31°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,94183	100	83,78	178,06	5,72	56,15	,5708
99	,94228	—	84,64	178,88	5,76	55,90	,5682
98	,94273	—	85,51	179,72	5,79	55,64	,5656
97	,94318	—	86,38	180,57	5,81	55,37	,5629
96	,94363	—	87,29	181,43	5,86	55,12	,5602
100 + 95	,94408	—	88,20	182,31	5,89	54,84	,5575
94	,94453	—	89,13	183,22	5,91	54,57	,5548
93	,94498	—	90,09	184,15	5,94	54,30	,5520
92	,94544	—	91,07	185,09	5,98	54,02	,5492
91	,94591	—	92,08	186,07	6,01	53,75	,5463
100 + 90	,94636	—	93,10	187,06	6,04	53,46	,5434
89	,94685	—	94,14	188,06	6,08	53,17	,5405
88	,94734	—	95,21	189,10	6,11	52,89	,5375
87	,94784	—	96,31	190,16	6,15	52,59	,5345
86	,94833	—	97,42	191,24	6,18	52,29	,5315
100 + 85	,94883	—	98,58	192,35	6,23	51,99	,5284
84	,94933	—	99,75	193,49	6,26	51,69	,5253
83	,94984	—	100,94	194,65	6,29	51,37	,5222
82	,95034	—	102,18	195,83	6,35	51,06	,5190
81	,95085	—	103,44	197,06	6,38	50,75	,5158
100 + 80	,95136	—	104,73	198,32	6,41	50,43	,5125
79	,95188	—	106,06	199,60	6,46	50,10	,5092
78	,95239	—	107,42	200,92	6,50	49,76	,5058
77	,95291	—	108,82	202,28	6,54	49,44	,5024
76	,95342	—	110,25	203,67	6,58	49,09	,4990
100 + 75	,95392	—	111,72	205,10	6,62	48,75	,4955
74	,95443	—	113,22	206,58	6,64	48,41	,4921
73	,95493	—	114,77	208,10	6,67	48,05	,4885
72	,95544	—	116,38	209,66	6,72	47,69	,4849
71	,95594	—	118,01	211,25	6,76	47,34	,4812
100 + 70	,95646	—	119,69	212,90	6,79	46,97	,4774
69	,95698	—	121,42	214,60	6,82	46,59	,4736
68	,95751	—	123,21	216,35	6,86	46,21	,4699
67	,95803	—	126,05	218,16	6,89	45,83	,4660
66	,95857	—	126,94	220,01	6,93	45,45	,4620
100 + 65	,95910	—	128,91	221,93	6,98	45,06	,4580
64	,95963	—	130,92	223,91	7,01	44,66	,4540
63	,96017	—	132,98	225,95	7,03	44,26	,4499
62	,96070	—	135,13	228,06	7,07	43,85	,4457
61	,96124	—	137,35	230,23	7,12	43,44	,4415
100 + 60	,96177	—	139,64	232,50	7,14	43,01	,4372
59	,96230	—	142,00	234,83	7,17	42,59	,4329
58	,96283	—	144,45	237,24	7,21	42,15	,4285
57	,96336	—	146,99	239,75	7,24	41,71	,4240
56	,96387	—	149,62	242,34	7,28	41,26	,4194
100 + 55	,96439	—	152,33	245,03	7,30	40,81	,4148
54	,96490	—	155,13	247,81	7,32	40,35	,4101
53	,96541	—	158,05	250,71	7,34	39,88	,4053
52	,96591	—	161,10	253,73	7,37	39,41	,4005
51	,96642	—	164,26	256,87	7,39	38,93	,3956

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96691	100	167,57	260,13	7,44	38,44	,3907
49	,96742	—	170,99	263,56	7,43	37,94	,3857
48	,96792	—	174,55	267,11	7,44	37,44	,3805
47	,96843	—	178,26	270,81	7,45	36,93	,3754
46	,96893	—	182,14	274,67	7,47	36,41	,3701
100 + 45	,96941	—	186,19	278,72	7,47	35,88	,3647
44	,96990	—	190,42	282,94	7,48	35,34	,3592
43	,97038	—	194,85	287,37	7,48	34,79	,3537
42	,97085	—	199,48	292,02	7,46	34,24	,3481
41	,97132	—	204,35	296,89	7,46	33,68	,3424
100 + 40	,97178	—	209,46	302,02	7,44	33,11	,3365
39	,97222	—	214,83	307,39	7,44	32,53	,3307
38	,97267	—	220,49	313,07	7,42	31,94	,3247
37	,97311	—	226,45	319,07	7,38	31,34	,3186
36	,97355	—	232,73	325,40	7,33	30,73	,3124
100 + 35	,97399	—	239,39	332,07	7,32	30,12	,3061
54	,97442	—	246,43	339,15	7,28	29,49	,2997
33	,97486	—	253,89	346,67	7,22	28,85	,2932
32	,97531	—	261,83	354,66	7,17	28,20	,2866
31	,97575	—	270,27	363,16	7,11	27,54	,2799
100 + 30	,97620	—	279,28	372,22	7,06	26,87	,2731
29	,97664	—	288,91	381,90	7,01	26,18	,2662
28	,97709	—	299,24	392,29	6,95	25,49	,2591
27	,97755	—	310,32	403,44	6,88	24,78	,2519
26	,97802	—	322,25	415,47	6,78	24,07	,2446
100 + 25	,97849	—	335,15	428,47	6,68	23,34	,2372
24	,97896	—	349,11	442,54	6,57	22,59	,2297
23	,97945	—	364,28	457,83	6,45	21,84	,2220
22	,97996	—	381,84	474,50	6,34	21,07	,2142
21	,98048	—	398,98	492,76	6,22	20,29	,2063
100 + 20	,98102	—	418,93	512,84	6,09	19,50	,1982
19	,98158	—	440,98	535,03	5,95	18,69	,1900
18	,98216	—	465,47	559,68	5,79	17,87	,1816
17	,98278	—	492,86	587,21	5,65	17,03	,1731
16	,98342	—	523,66	618,17	5,49	16,17	,1644
100 + 15	,98409	—	558,57	653,25	5,32	15,31	,1556
14	,98479	—	598,47	693,33	5,14	14,42	,1466
13	,98554	—	644,51	739,55	4,96	13,52	,1375
12	,98632	—	698,22	793,46	4,76	12,60	,1281
11	,98716	—	761,69	857,13	4,56	11,67	,1186
100 + 10	,98804	—	837,86	933,54	4,32	10,71	,1089
9	,98896	—	930,96	1026,86	4,10	9,74	,0990
8	,98997	—	1047,32	1143,47	3,85	8,74	,0889
7	,99103	—	1196,95	1293,34	3,61	7,73	,0786
6	,99216	—	1396,44	1493,08	3,36	6,70	,0681
100 + 5	,99336	—	1675,73	1772,64	3,09	5,64	,0573
4	,99466	—	2094,65	2191,85	2,80	4,56	,0464
3	,99605	—	2792,86	2890,32	2,54	3,46	,0352
2	,99754	—	4189,30	4886,96	2,34	2,33	,0237
1	,99913	—	8378,58	8476,39	2,19	1,18	,0120

TABLE I. HEAT 32°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83807	100	—	100,00	—	100,00	1,0158	100 + 50	,90937	100	41,87	138,24	3,63	72,34	,7348
1	,84039	—	0,84	100,72	0,12	99,28	1,0086	51	,91027	—	42,70	139,02	3,68	71,93	,7308
2	,84265	—	1,68	101,45	0,23	98,57	1,0014	52	,91113	—	43,54	139,81	3,73	71,52	,7266
3	,84485	—	2,51	102,18	0,33	97,87	,9943	53	,91199	—	44,38	140,60	3,78	71,12	,7226
4	,84698	—	3,35	102,91	0,44	97,18	,9872	54	,91284	—	45,22	141,39	3,83	70,73	,7185
100 + 5	,84905	—	4,19	103,64	0,55	96,49	,9801	100 + 55	,91367	—	46,06	142,17	3,89	70,34	,7145
6	,85107	—	5,03	104,38	0,65	95,80	,9733	56	,91448	—	46,90	142,96	3,94	69,95	,7106
7	,85304	—	5,87	105,12	0,75	95,13	,9664	57	,91530	—	47,73	143,75	3,98	69,56	,7067
8	,85496	—	6,70	105,87	0,83	94,46	,9596	58	,91609	—	48,56	144,54	4,02	69,18	,7028
9	,85683	—	7,54	106,61	0,93	93,80	,9529	59	,91687	—	49,40	145,33	4,07	68,81	,6990
100 + 10	,85866	—	8,37	107,36	1,01	93,14	,9462	100 + 60	,91764	—	50,24	146,12	4,12	68,43	,6952
11	,86046	—	9,21	108,11	1,10	92,50	,9396	61	,91840	—	51,08	146,91	4,17	68,06	,6914
12	,86224	—	10,05	108,86	1,19	91,86	,9331	62	,91916	—	51,92	147,70	4,22	67,70	,6877
13	,86396	—	10,88	109,61	1,27	91,23	,9267	63	,91990	—	52,75	148,49	4,26	67,34	,6840
14	,86565	—	11,72	110,37	1,35	90,61	,9204	64	,92063	—	53,59	149,29	4,30	66,98	,6804
100 + 15	,86730	—	12,56	111,12	1,44	89,99	,9141	100 + 65	,92135	—	54,43	150,08	4,35	66,63	,6769
16	,86890	—	13,40	111,88	1,52	89,38	,9079	66	,92206	—	55,26	150,87	4,39	66,28	,6733
17	,87045	—	14,23	112,64	1,59	88,77	,9018	67	,92276	—	56,11	151,67	4,44	65,93	,6698
18	,87198	—	15,07	113,40	1,67	88,17	,8958	68	,92345	—	56,94	152,46	4,48	65,59	,6663
19	,87348	—	15,91	114,16	1,75	87,58	,8898	69	,92413	—	57.77	153,26	4,51	65,25	,6628
100 + 20	,87494	—	16,75	114,92	1,83	87,00	,8838	100 + 70	,92481	—	58,61	154,05	4,56	64,91	,6594
21	,87638	—	17,58	115,68	1,90	86,42	,8779	71	,92547	—	59,45	154,85	4,60	64,58	,6560
22	,87780	—	18,42	116,45	1,97	85,85	,8721	72	,92612	—	60,28	155,64	4,64	64,25	,6527
23	,87921	—	19,26	117,22	2,04	85,29	,8664	73	,92676	—	61,12	156,44	4,68	63,92	,6494
24	,88059	—	20,10	117,99	2,11	84,73	,8607	74	,92739	—	61,97	157,24	4,73	63,60	,6461
100 + 25	,88193	—	20,94	118,76	2,18	84,18	,8552	100 + 75	,92806	—	62,80	158,03	4,77	63,28	,6428
26	,88326	—	21,77	119,53	2,24	83,64	,8497	76	,92869	—	63,64	158,82	4,82	62,96	,6396
27	,88456	—	22,61	120,31	2,30	83,11	,8443	77	,92930	—	64,48	159,63	4,85	62,64	,6364
28	,88584	—	23,45	121,09	2,36	82,58	,8389	78	,92994	—	65,31	160,42	4,89	62,33	,6333
29	,88709	—	24,28	121,86	2,42	82,05	,8336	79	,93050	—	66,15	161,22	4,93	62,03	,6300
100 + 30	,88833	—	25,12	122,64	2,48	81,53	,8283	100 + 80	,93109	—	67,00	162,02	4,98	61,72	,6270
31	,88955	—	25,96	123,42	2,54	81,02	,8231	81	,93168	—	67,82	162,81	5,01	61,42	,6240
32	,89076	—	26,80	124,19	2,61	80,52	,8180	82	,93226	—	68,66	163,61	5,05	61,12	,6210
33	,89195	—	27,64	124,97	2,67	80,02	,8129	83	,93283	—	69,50	164,41	5,09	60,82	,6179
34	,89311	—	28,47	125,75	2,72	79,53	,8079	84	,93339	—	70,34	165,21	5,13	60,53	,6149
100 + 35	,89424	—	29,31	126,52	2,79	79,03	,8029	100 + 85	,93394	—	71,18	166,01	5,17	60,23	,6119
36	,89537	—	30,15	127,30	2,85	78,56	,7980	86	,93449	—	72,01	166,81	5,20	59,95	,6091
37	,89647	—	30,99	128,07	2,92	78,08	,7932	87	,93503	—	72,85	167,61	5,24	59,66	,6062
38	,89756	—	31,83	128,85	2,98	77,61	,7884	88	,93556	—	73,68	168,41	5,27	59,38	,6032
39	,88863	—	32,65	129,63	3.02	77,14	,7837	89	,93609	—	74,52	169,21	5,31	59,10	,6004
100 + 40	,89968	—	33,50	130,41	3,09	76,67	,7789	100 + 90	,93661	—	75,36	170,01	5,35	58,82	,5975
41	,90072	—	34,34	131,19	3,15	76,22	,7744	91	,93712	—	76,20	170,82	5,38	58,54	,5948
42	,90175	—	35,17	131,97	3,20	75,77	,7698	92	,93762	—	77,04	171,62	5,42	58,27	,5920
43	,90276	—	36,01	132,75	3,26	75,33	,7653	93	,93812	—	77,87	172,42	5,45	58,00	,5892
44	,90376	—	36,84	133,53	3,31	74,89	,7608	94	,93861	—	78,71	173,22	5,49	57,73	,5866
100 + 45	,90474	—	37,68	134,31	3,37	74,45	,7563	100 + 95	,93910	—	79,55	174,02	5,53	57,46	,5838
46	,90570	—	38,51	135,10	3,41	74,02	,7520	96	,93958	—	80,38	174,82	5,50	57,21	,5812
47	,90665	—	39,35	135,88	3,47	73,59	,7477	97	,94005	—	81,21	175,62	5,59	56,94	,5785
48	,90758	—	40,19	136,67	3,52	73,17	,7434	98	,94052	—	82,04	176,42	5,62	56,68	,5758
49	,90849	—	41,03	137,45	3,58	72,75	,7391	99	,94099	—	82,88	177,23	5,65	56,42	,5732

TABLE II.

HEAT 32°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,94144	100	83,74	178,04	5,70	56,16	,5706	100 + 50	,96663	100	167,48	260,08	7,40	38,44	,3905
99	,94189	—	84,59	178,86	5,73	55,91	,5679	49	,96714	—	170,89	263,50	7,39	37,95	,3856
98	,94233	—	85,46	179,70	5,76	55,65	,5653	48	,96765	—	174,45	267,04	7,41	37,45	,3804
97	,94278	—	86,33	180,55	5,78	55,38	,5626	47	,96816	—	178,16	270,73	7,43	36,94	,3752
96	,94323	—	87,24	181,41	5,83	55,12	,5600	46	,96867	—	182,03	274,59	7,44	36,42	,3700
100 + 95	,94369	—	88,15	182,29	5,86	54,85	,5573	100 + 45	,96915	—	186,08	278,64	7,44	35,89	,3646
94	,94413	—	89,08	183,20	5,88	54,58	,5545	44	,96965	—	190,31	282,86	7,45	35,35	,3591
93	,94459	—	90,04	184,12	5,92	54,31	,5517	43	,97013	—	194,74	287,29	7,45	34,80	,3536
92	,94505	—	91,02	185,07	5,95	54,03	,5489	42	,97061	—	199,37	291,94	7,43	34,25	,3480
91	,94552	—	92,02	186,04	5,98	53,75	,5461	41	,97108	—	204,23	296,80	7,43	33,69	,3423
100 + 90	,94598	—	93,04	187,03	6,01	53,47	,5431	100 + 40	,97155	—	209,34	301,92	7,42	33,12	,3365
89	,94647	—	94,08	188,04	6,04	53,18	,5403	39	,97200	—	214,71	307,29	7,42	32,54	,3306
88	,94696	—	95,15	189,07	6,08	52,89	,5373	38	,97245	—	220,36	312,97	7,39	31,95	,3246
87	,94746	—	96,25	190,13	6,12	52,59	,5343	37	,97290	—	226,32	318,97	7,35	31,35	,3185
86	,94795	—	97,37	191,21	6,16	52,30	,5313	36	,97335	—	232,60	325,30	7,30	30,74	,3123
100 + 85	,94845	—	98,52	192,32	6,20	51,99	,5282	100 + 35	,97379	—	239,25	331,96	7,29	30,12	,3060
84	,94896	—	99,69	193,46	6,23	51,69	,5251	34	,97423	—	246,29	339,03	7,26	29,50	,2996
83	,94947	—	100,89	194,62	6,27	51,38	,5220	33	,97468	—	253,74	346,55	7,19	28,86	,2931
82	,94997	—	102,12	195,81	6,31	51,07	,5188	32	,97513	—	261,68	354,54	7,14	28,21	,2865
81	,95048	—	103,38	197,03	6,35	50,76	,5156	31	,97558	—	270,12	363,03	7,09	27,55	,2798
100 + 80	,95099	—	104,67	198,29	6,38	50,44	,5123	100 + 30	,97604	—	279,12	372,08	7,04	26,88	,2730
79	,95151	—	106,00	199,57	6,43	50,11	,5090	29	,97649	—	288,74	381,76	6,98	26,19	,2661
78	,95202	—	107,36	200,89	6,47	49,77	,5046	28	,97695	—	299,07	392,15	6,92	25,50	,2591
77	,95254	—	108,76	202,25	6,51	49,45	,5022	27	,97741	—	310,14	403,29	6,85	24,79	,2519
76	,95305	—	110,19	203,64	6,55	49,10	,4988	26	,97789	—	322,06	415,31	6,75	24,08	,2446
100 + 75	,95355	—	111,66	205,07	6,59	48,76	,4953	100 + 25	,97837	—	334,96	428,30	6,66	23,35	,2372
74	,95406	—	113,15	206,55	6,60	48,42	,4919	24	,97885	—	348,91	442,35	6,56	22,60	,2297
73	,95457	—	114,70	208,06	6,64	48,06	,4883	23	,97935	—	364,07	457,63	6,44	21,85	,2220
72	,95508	—	116,31	209,63	6,68	47,70	,4847	22	,97987	—	381,62	474,29	6,33	21,08	,2142
71	,95558	—	117,94	211,22	6,72	47,34	,4810	21	,98040	—	398,75	492,53	6,22	20,30	,2063
100 + 70	,95610	—	119,62	212,87	6,75	46,98	,4772	100 + 20	,98096	—	418,69	512,60	6,09	19,51	,1981
69	,95662	—	121,35	214,57	6,78	46,60	,4734	19	,98152	—	440,73	534,77	5,96	18,70	,1900
68	,95715	—	123,14	216,31	6,83	46,22	,4697	18	,98211	—	465,20	559,41	5,79	17,87	,1816
67	,95768	—	124,98	218,12	6,86	45,84	,4658	17	,98273	—	492,58	586,92	5,66	17,04	,1731
66	,95822	—	126,87	219,98	6,89	45,46	,4618	16	,98338	—	523,36	617,86	5,50	16,18	,1644
100 + 65	,95875	—	128,83	221,89	6,94	45,07	,4578	100 + 15	,98406	—	558,25	652,92	5,33	15,32	,1556
64	,95929	—	130,84	223,87	6,97	44,67	,4538	14	,98477	—	598,13	692,97	5,16	14,42	,1466
63	,95983	—	132,90	225,91	6,99	44,26	,4497	13	,98552	—	644,14	739,17	4,97	13,53	,1375
62	,96037	—	135,05	228,01	7,04	43,85	,4455	12	,98631	—	697,82	793,04	4,78	12,61	,1281
61	,96091	—	137,27	230,19	7,08	43,44	,4413	11	,98715	—	761,26	856,68	4,58	11,67	,1186
100 + 60	,96145	—	139,56	232,45	7,11	43,02	,4370	100 + 10	,98804	—	837,38	933,04	4,34	10,72	,1089
59	,96198	—	141,92	234,78	7,14	42,60	,4327	9	,98897	—	930,43	1026,30	4,13	9,74	,0990
58	,96251	—	144,36	237,19	7,17	42,16	,4283	8	,98998	—	1046,72	1142,85	3,87	8,75	,0889
57	,96304	—	146,90	239,70	7,20	41,72	,4238	7	,99105	—	1196,27	1292,63	3,64	7,73	,0786
56	,96356	—	149,53	242,29	7,24	41,27	,4193	6	,99218	—	1395,65	1492,25	3,40	6,70	,0681
100 + 55	,96408	—	152,24	244,97	7,27	40,82	,4146	100 + 5	,99338	—	1674,78	1771,65	3,13	5,64	,0573
54	,96459	—	155,04	247,75	7,29	40,36	,4100	4	,99469	—	2093,45	2190,63	2,82	4,56	,0464
53	,96511	—	157,96	250,66	7,30	39,89	,4052	3	,99608	—	2791,27	2888,71	2,56	3,46	,0352
52	,96562	—	161,01	253,68	7,33	39,42	,4004	2	,99757	—	4186,91	4284,58	2,33	2,33	,0237
51	,96613	—	164,17	256,81	7,36	38,93	,3955	1	,99916	—	8373,79	8471,67	2,12	1,18	,0120

TABLE I. HEAT 33°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83762	100	—	100,00	—	100,00	1,0153
1	,83994	—	0,84	100,72	0,12	99,28	1,0081
2	,84220	—	1,68	101,45	0,23	98,57	1,0009
3	,84440	—	2,51	102,18	0,33	97,87	,9938
4	,84653	—	3,35	102,91	0,44	97,18	,9867
100 + 5	,84860	—	4,19	103,64	0,55	96,49	,9796
6	,85062	—	5,03	104,38	0,65	95,80	,9728
7	,85259	—	5,86	105,12	0,74	95,13	,9659
8	,85451	—	6,70	105,87	0,83	94,46	,9591
9	,85638	—	7,53	106,61	0,92	93,80	,9524
100 + 10	,85820	—	8,37	107,36	1,01	93,14	,9457
11	,86000	—	9,21	108,11	1,10	92,50	,9391
12	,86178	—	10,04	108,86	1,18	91,86	,9326
13	,86349	—	10,88	109,61	1,27	91,23	,9262
14	,86518	—	11,71	110,37	1,34	90,61	,9199
100 + 15	,86683	—	12,55	111,12	1,43	89,99	,9136
16	,86842	—	13,39	111,88	1,51	89,38	,9074
17	,86998	—	14,23	112,64	1,59	88,77	,9013
18	,87151	—	15,07	113,40	1,67	88,17	,8953
19	,87302	—	15,90	114,16	1,74	87,58	,8893
100 + 20	,87448	—	16,74	114,92	1,82	87,00	,8833
21	,87592	—	17,57	115,69	1,88	86,42	,8774
22	,87735	—	18,41	116,46	1,95	85,85	,8717
23	,87876	—	19,25	117,22	2,03	85,29	,8660
24	,88014	—	20,09	117,99	2,10	84,73	,8603
100 + 25	,88149	—	20,93	118,76	2,17	84,18	,8548
26	,88281	—	21,76	119,53	2,23	83,64	,8493
27	,88412	—	22,59	120,31	2,28	83,11	,8439
28	,88540	—	23,44	121,08	2,36	82,58	,8385
29	,88665	—	24,27	121,86	2,41	82,05	,8332
100 + 30	,88789	—	25,11	122,64	2,47	81,53	,8279
31	,88911	—	25,94	123,41	2,53	81,03	,8227
32	,89032	—	26,78	124,19	2,59	80,52	,8176
33	,89151	—	27,62	124,96	2,66	80,02	,8125
34	,89267	—	28,45	125,74	2,71	79,53	,8075
100 + 35	,89380	—	29,29	126,51	2,78	79,04	,8025
36	,89494	—	30,13	127,29	2,84	78,56	,7976
37	,89604	—	30,97	128,06	2,91	78,08	,7928
38	,89713	—	31,81	128,84	2,97	77,61	,7880
39	,88820	—	32,63	129,63	3,00	77,14	,7833
100 + 40	,89925	—	33,48	130,41	3,07	76,68	,7785
41	,90029	—	34,32	131,19	3,13	76,22	,7740
42	,90132	—	35,15	131,97	3,18	75,77	,7694
43	,90233	—	35,99	132,75	3,24	75,33	,7649
44	,90333	—	36,82	133,53	3,29	74,89	,7604
100 + 45	,90431	—	37,66	134,31	3,35	74,46	,7559
46	,90527	—	38,49	135,09	3,40	74,02	,7517
47	,90622	—	39,33	135,87	3,46	73,60	,7473
48	,90715	—	40,17	136,66	3,51	73,18	,7431
49	,90807	—	41,01	137,44	3,57	72,75	,7388

I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90895	100	41,85	138,23	3,62	72,34	,7345
51	,90985	—	42,67	139,01	3,66	71,93	,7304
52	,91071	—	43,52	139,80	3,72	71,53	,7263
53	,91157	—	44,35	140,59	3,76	71,13	,7223
54	,91242	—	45,19	141,38	3,81	70,73	,7182
100 + 55	,91325	—	46,03	142,16	3,87	70,34	,7142
56	,91406	—	46,87	142,95	3,92	69,95	,7103
57	,91488	—	47,70	143,74	3,96	69,57	,7064
58	,91567	—	48,53	144,53	4,00	69,19	,7025
59	,91645	—	49,37	145,32	4,05	68,81	,6986
100 + 60	,91722	—	50,21	146,11	4,10	68,44	,6949
61	,91799	—	51,05	146,90	4,15	68,07	,6911
62	,91875	—	51,89	147,69	4,20	67,71	,6874
63	,91949	—	52,72	148,48	4,24	67,35	,6837
64	,92021	—	53,56	149,28	4,28	66,99	,6801
100 + 65	,92093	—	54,40	150,07	4,33	66,64	,6766
66	,92164	—	55,23	150,86	4,37	66,29	,6730
67	,92234	—	56,07	151,66	4,41	65,94	,6695
68	,92303	—	56,91	152,45	4,46	65,59	,6660
69	,92371	—	57,74	153,24	4,50	65,25	,6625
100 + 70	,92439	—	58,58	154,04	4,54	64,92	,6591
71	,92505	—	59,41	154,83	4,58	64,59	,6557
72	,92571	—	60,25	155,63	4,62	64,26	,6524
73	,92634	—	61,09	156,43	4,66	63,93	,6491
74	,92698	—	61,93	157,22	4,71	63,61	,6458
100 + 75	,92764	—	62,76	158,02	4,74	63,29	,6425
76	,92827	—	63,60	158,81	4,79	62,97	,6393
77	,92888	—	64,44	159,61	4,83	62,65	,6361
78	,92951	—	65,27	160,40	4,87	62,34	,6330
79	,93009	—	66,11	161,20	4,91	62,04	,6298
100 + 80	,93008	—	66,96	162,00	4,96	61,73	,6267
81	,93127	—	67,78	162,79	4,99	61,43	,6237
82	,93185	—	68,62	163,59	5,03	61,13	,6207
83	,93243	—	69,46	164,39	5,07	60,83	,6176
84	,93299	—	70,30	165,19	5,11	60,54	,6146
100 + 85	,93354	—	71,14	165,99	5,15	60,24	,6116
86	,93409	—	71,97	166,79	5,18	59,96	,6088
87	,93463	—	72,81	167,59	5,22	59,67	,6059
88	,93516	—	73,64	168,39	5,25	59,39	,6030
89	,93569	—	74,48	169,19	5,29	59,11	,6001
100 + 90	,93621	—	75,32	169,99	5,33	58,83	,5972
91	,93672	—	76,15	170,80	5,35	58,55	,5945
92	,93722	—	77,99	171,60	5,39	58,28	,5917
93	,93772	—	77,82	172,40	5,42	58,01	,5890
94	,93821	—	78,66	173,20	5,46	57,74	,5863
100 + 95	,93870	—	79,50	174,00	5,50	57,47	,5835
96	,93918	—	80,33	174,80	5,53	57,21	,5809
97	,93965	—	81,16	175,60	5,56	56,95	,5783
98	,94012	—	82,00	176,40	5,60	56,69	,5756
99	,94059	—	82,84	177,21	5,63	56,43	,5730

TABLE II. HEAT 33°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp							
100+100	,94105	100	83,69	178,02	5,67	56,16	,5703
99	,94149	—	84,54	178,84	5,70	55,91	,5677
98	,94194	—	85,41	179,68	5,73	55,65	,5651
97	,94239	—	86,28	180,53	5,75	55,39	,5624
96	,94284	—	87,19	181,39	5,80	55,13	,5598
100 + 95	,94329	—	88,10	182,27	5,83	54,85	,5570
94	,94374	—	89,03	183,18	5,85	54,59	,5543
93	,94420	—	89,99	184,10	5,89	54,32	,5515
92	,94466	—	90,97	185,04	5,93	54,04	,5487
91	,94513	—	91,97	186,02	5,95	53,76	,5459
100 + 90	,94560	—	92,99	187,00	5,99	53,48	,5429
89	,94609	—	94,03	188,01	6,02	53,19	,5401
88	,94658	—	95,10	189,05	6,05	52,90	,5371
87	,94708	—	96,20	190,10	6,10	52,60	,5341
86	,94758	—	97,31	191,19	6,12	52,31	,5311
100 + 85	,94808	—	98,47	192,29	6,18	52,00	,5280
84	,94859	—	99,64	193,43	6,21	51,70	,5249
83	,94910	—	100,83	194,59	6,24	51,39	,5218
82	,94960	—	102,06	195,78	6,28	51,08	,5186
81	,95012	—	103,32	197,00	6,32	50,77	,5154
100 + 80	,95062	—	104,61	198,26	6,35	50,45	,5121
79	,95114	—	105,94	199,54	6,40	50,11	,5088
78	,95165	—	107,30	200,86	6,44	49,78	,5044
77	,95217	—	108,69	202,22	6,47	49,46	,5020
76	,95268	—	110,13	203,61	6,52	49,11	,4986
100 + 75	,95319	—	111,59	205,04	6,55	48,77	,4952
74	,95370	—	113,09	206,52	6,57	48,42	,4917
73	,95421	—	114,64	208,03	6,61	48,07	,4881
72	,95472	—	116,24	209,59	6,65	47,71	,4845
71	,95522	—	117,87	211,19	6,68	47,35	,4808
100 + 70	,95574	—	119,55	212,83	6,72	46,99	,4770
69	,95626	—	121,28	214,53	6,75	46,61	,4732
68	,95680	—	123,07	216,28	6,79	46,23	,4695
67	,95733	—	124,91	218,09	6,82	45,85	,4656
66	,95787	—	126,80	219,94	6,86	45,47	,4616
100 + 65	,95840	—	128,75	221,85	6,90	45,08	,4576
64	,95895	—	130,77	223,83	6,94	44,68	,4536
63	,95949	—	132,83	225,86	6,97	44,27	,4495
62	,96004	—	134,97	227,97	7,00	43,86	,4453
61	,96058	—	137,19	230,14	7,05	43,45	,4411
100 + 60	,96112	—	139,48	232,41	7,07	43,03	,4369
59	,96166	—	141,84	234,73	7,11	42,60	,4325
58	,96219	—	144,28	237,14	7,14	42,17	,4281
57	,96272	—	140,82	239,65	7,17	41,73	,4236
56	,96325	—	149,45	242,24	7,21	41,28	,4192
100 + 55	,96377	—	152,16	244,92	7,24	40,83	,4145
54	,96429	—	154,95	247,70	7,25	40,37	,4099
53	,96481	—	157,87	250,60	7,27	39,90	,4051
52	,96533	—	160,92	253,62	7,30	39,43	,4003
51	,96584	—	164,08	256,76	7,32	38,94	,3954

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96635	100	167,38	260,02	7,36	38,45	,3904
49	,96687	—	170,79	263,43	7,36	37,96	,3855
48	,96738	—	174,35	266,97	7,38	37,46	,3803
47	,96790	—	178,06	270,66	7,40	36,95	,3752
46	,96841	—	181,93	274,51	7,42	36,43	,3699
100 + 45	,96890	—	185,97	278,56	7,41	35,90	,3645
44	,96940	—	190,20	282,78	7,42	35,36	,3590
43	,96989	—	194,63	287,20	7,43	34,81	,3535
42	,97037	—	199,26	291,85	7,41	34,26	,3479
41	,97085	—	204,11	296,71	7,40	33,70	,3422
100 + 40	,97132	—	209,22	301,82	7,40	33,13	,3364
39	,97178	—	214,59	307,20	7,39	32,55	,3305
38	,97223	—	220,23	312,87	7,36	31,96	,3245
37	,97269	—	226,19	318,87	7,32	31,36	,3184
36	,97315	—	232,47	325,19	7,28	30,75	,3122
100 + 35	,97359	—	239,11	331,85	7,26	30,13	,3059
34	,97404	—	246,15	338,92	7,23	29,51	,2996
33	,97450	—	253,60	346,43	7,17	28,87	,2931
32	,97495	—	261,53	354,41	7,12	28,22	,2865
31	,97541	—	269,97	362,90	7,07	27,56	,2798
100 + 30	,97588	—	278,96	371,94	7,02	26,89	,2730
29	,97634	—	288,58	381,61	6,97	26,20	,2661
28	,97681	—	298,90	392,00	6,90	25,51	,2590
27	,97728	—	309,96	403,14	6,82	24,80	,2519
26	,97776	—	321,88	415,15	6,73	24,09	,2446
100 + 25	,97825	—	334,77	428,12	6,65	23,36	,2371
24	,97874	—	348,71	442,16	6,55	22,61	,2296
23	,97925	—	363,86	457,43	6,43	21,86	,2220
22	,97978	—	381,40	474,08	6,32	21,09	,2142
21	,98033	—	398,52	492,30	6,22	20,31	,2062
100 + 20	,98090	—	418,45	512,36	6,09	19,52	,1981
19	,98146	—	440,48	534,51	5,97	18,71	,1899
18	,98206	—	464,94	559,14	5,80	17,88	,1816
17	,98269	—	492,30	586,63	5,67	17,05	,1731
16	,98334	—	523,06	617,55	5,51	16,19	,1644
100 + 15	,98403	—	557,93	652,59	5,34	15,33	,1556
14	,98475	—	597,79	692,62	5,17	14,43	,1466
13	,98550	—	643,77	738,79	4,98	13,54	,1375
12	,98630	—	697,42	792,62	4,80	12,62	,1281
11	,98715	—	760,83	856,23	4,60	11,68	,1186
100 + 10	,98804	—	836,90	932,54	4,36	10,72	,1089
9	,98898	—	929,90	1025,75	4,15	9,75	,0990
8	,98999	—	1046,13	1142,23	3,90	8,75	,0889
7	,99106	—	1195,59	1291,92	3,67	7,74	,0786
6	,99220	—	1394,86	1491,43	3,43	6,70	,0681
100 + 5	,99340	—	1673,83	1770,67	3,16	5,64	,0573
4	,99471	—	2092,26	2189,41	2,85	4,56	,0464
3	,99610	—	2789,69	2887,10	2,59	3,46	,0352
2	,99759	—	4184,53	4282,19	2,34	2,34	,0237
1	,99918	—	8369 04	8466,95	2,09	1,18	,0120

TABLE I. HEAT 34°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83717	100	—	100,00	—	100,00	1,0147
1	,83949	—	0,84	100,72	0,12	99,28	1,0076
2	,84174	—	1,68	101,45	0,23	98,57	1,0004
3	,84395	—	2,51	102,18	0,33	97,87	,9932
4	,84608	—	3,35	102,91	0,44	97,18	,9861
100 + 5	,84815	—	4,19	103,64	0,55	96,49	,9791
6	,85017	—	5,03	104,38	0,65	95,80	,9722
7	,85213	—	5,86	105,12	0,74	95,13	,9654
8	,85405	—	6,70	105,87	0,83	94,46	,9586
9	,85593	—	7,53	106,61	0,92	93,80	,9519
100 + 10	,85774	—	8,37	107,36	1,01	93,14	,9452
11	,85954	—	9,20	108,11	1,09	92,50	,9386
12	,86131	—	10,04	108,86	1,18	91,86	,9321
13	,86302	—	10,88	109,61	1,27	91,23	,9257
14	,86470	—	11,71	110,37	1,34	90,61	,9194
100 + 15	,86635	—	12,55	111,13	1,42	89,99	,9131
16	,86794	—	13,39	111,89	1,50	89,38	,9069
17	,86951	—	14,22	112,64	1,58	88,77	,9008
18	,87105	—	15,06	113,40	1,66	88,17	,8948
19	,87255	—	15,89	114,16	1,73	87,58	,8888
100 + 20	,87402	—	16,73	114,93	1,80	87,00	,8829
21	,87547	—	17,56	115,69	1,87	86,42	,8770
22	,87690	—	18,40	116,46	1,94	85,85	,8712
23	,87831	—	19,24	117,23	2,01	85,30	,8656
24	,87969	—	20,08	118,00	2,08	84,74	,8599
100 + 25	,88104	—	20,92	118,76	2,16	84,19	,8543
26	,88237	—	21,74	119,54	2,20	83,65	,8489
27	,88368	—	22,58	120,31	2,27	83,11	,8435
28	,88495	—	23,42	121,08	2,34	82,58	,8381
29	,88621	—	24,26	121,85	2,41	82,06	,8328
100 + 30	,88745	—	25,09	122,64	2,45	81,54	,8275
31	,88867	—	25,93	123,41	2,52	81,03	,8223
32	,88988	—	26,77	124,18	2,59	80,53	,8172
33	,89107	—	27,61	124,96	2,65	80,03	,8121
34	,89223	—	28,44	125,73	2,71	79,53	,8071
100 + 35	,89337	—	29,28	126,51	2,77	79,04	,8021
36	,89451	—	30,12	127,29	2,83	78,56	,7972
37	,89561	—	30,95	128,06	2,89	78,08	,7924
38	,89670	—	31,79	128,83	2,96	77,61	,7876
39	,88777	—	32,62	129,62	3,00	77,14	,7829
100 + 40	,89882	—	33,46	130,40	3,06	76,68	,7782
41	,89986	—	34,30	131,18	3,12	76,23	,7736
42	,90089	—	35,13	131,96	3,17	75,78	,7690
43	,90190	—	35,97	132,74	3,23	75,34	,7645
44	,90290	—	36,80	133,52	3,28	74,89	,7600
100 + 45	,90388	—	37,64	134,30	3,34	74,46	,7556
46	,90484	—	38,47	135,08	3,39	74,03	,7513
47	,90579	—	39,31	135,86	3,45	73,60	,7469
48	,90672	—	40,15	136,65	3,50	73,18	,7427
49	,90764	—	40,98	137,43	3,55	72,76	,7384

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of Bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90853	100	41,82	138,22	3,60	72,35	,7342
51	,90943	—	42,65	139,00	3,65	71,94	,7301
52	,91029	—	43,49	139,79	3,70	71,53	,7259
53	,91115	—	44,33	140,58	3,75	71,13	,7219
54	,91200	—	45,17	141,37	3,80	70,74	,7179
100 + 55	,91283	—	46,01	142,15	3,86	70,35	,7138
56	,91365	—	46,84	142,94	3,90	69,96	,7100
57	,91446	—	47,67	143,73	3,94	69,57	,7061
58	,91525	—	48,51	144,52	3,99	69,19	,7021
59	,91603	—	49,34	145,31	4,03	68,82	,6983
100 + 60	,91681	—	50,18	146,10	4,08	68,44	,6945
61	,91758	—	51,02	146,89	4,13	68,07	,6908
62	,91833	—	51,86	147,68	4,18	67,71	,6871
63	,91907	—	52,69	148,47	4,22	67,35	,6834
64	,91979	—	53,53	149,27	4,26	66,99	,6798
100 + 65	,92051	—	54,37	150,06	4,31	66,64	,6763
66	,92122	—	55,20	150,85	4,35	66,29	,6727
67	,92192	—	56,04	151,65	4,39	65,94	,6692
68	,92261	—	56,88	152,44	4,44	65,60	,6657
69	,92329	—	57,71	153,23	4,48	65,26	,6622
100 + 70	,92397	—	58,55	154,03	4,52	64,92	,6588
71	,92464	—	59,38	154,82	4,56	64,59	,6554
72	,92530	—	60,22	155,62	4,60	64,26	,6521
73	,92593	—	61,05	156,41	4,64	63,93	,6488
74	,92657	—	61,90	157,21	4,69	63,61	,6455
100 + 75	,92722	—	62,73	158,00	4,73	63,29	,6422
76	,92785	—	63,56	158,80	4,76	62,97	,6390
77	,92846	—	64,41	159,60	4,81	62,65	,6358
78	,92908	—	65,23	160,39	4,84	62,34	,6327
79	,92968	—	66,07	161,19	4,88	62,04	,6295
100 + 80	,93027	—	66,92	161,98	4,94	61,73	,6265
81	,93086	—	67,74	162,77	4,97	61,43	,6234
82	,93144	—	68,58	163,57	5,01	61,13	,6204
83	,93202	—	69,42	164,37	5,05	60,83	,6173
84	,93259	—	70,26	165,17	5,09	60,54	,6143
100 + 85	,93314	—	71,10	165,97	5,13	60,25	,6114
86	,93369	—	71,93	166,77	5,16	59,96	,6085
87	,93423	—	72,77	167,57	5,20	59,68	,6056
88	,93476	—	73,60	168,37	5,23	59,39	,6027
89	,93529	—	74,44	169,17	5,27	59,11	,5998
100 + 90	,93581	—	75,28	169,97	5,31	58,83	,5970
91	,93632	—	76,11	170,78	5,33	58,55	,5942
92	,93682	—	76,95	171,58	5,37	58,28	,5914
93	,93732	—	77,78	172,38	5,40	58,01	,5887
94	,93781	—	78,62	173,18	5,44	57,74	,5860
100 + 95	,93830	—	79,46	173,98	5,48	57,47	,5833
96	,93878	—	80,28	174,78	5,50	57,22	,5806
97	,93925	—	81,12	175,58	5,54	56,95	,5780
98	,93972	—	81,95	176,38	5,57	56,69	,5754
99	,94019	—	82,80	177,19	5,61	56,44	,5728

TABLE II. HEAT 34°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100+100	,94065	100	83,64	178,00	5,64	56,17	,5701	100 + 50	,96607	100	167,28	259,96	7,32	38,46	,3903
99	,94110	—	84,49	178,82	5,67	55,92	,5674	49	,96660	—	170,70	263,37	7,33	37,97	,3853
98	,94154	—	85,36	179,66	5,70	55,66	,5648	48	,96711	—	174,25	266,90	7,35	37,47	,3802
97	,94199	—	86,23	180,51	5,72	55,39	,5621	47	,96764	—	177,96	270,59	7,37	36,96	,3751
96	,94244	—	87,14	181,37	5,77	55,13	,5595	46	,96815	—	181,83	274,44	7,39	36,44	,3698
100 + 95	,94289	—	88,05	182,25	5,80	54,86	,5568	100 + 45	,96865	—	185,87	278,48	7,39	35,91	,3644
94	,94335	—	88,98	183,16	5,82	54,59	,5540	44	,96915	—	190,09	282,70	7,39	35,37	,3589
93	,94381	—	89,84	184,07	5,87	54,33	,5512	43	,96965	—	194,52	287,12	7,40	34,82	,3534
92	,94427	—	90,92	185,02	5,90	54,05	,5484	42	,97013	—	199,15	291,76	7,39	34,27	,3478
91	,94475	—	91,92	186,00	5,92	53,77	,5456	41	,97062	—	204,00	296,62	7,38	33,71	,3421
100 + 90	,94522	—	92,94	186,98	5,96	53,48	,5427	100 + 40	,97110	—	209,10	301,73	7,37	33,14	,3363
89	,94571	—	93,98	187,99	5,99	53,19	,5399	39	,97156	—	214,47	307,11	7,36	32,56	,3304
88	,94621	—	95,04	189,02	6,02	52,91	,5369	38	,97202	—	220,11	312,78	7,33	31,97	,3245
87	,94671	—	96,14	190,08	6,06	52,61	,5339	37	,97248	—	226,06	318,77	7,29	31,37	,3184
86	,94721	—	97,26	191,16	6,10	52,32	,5309	36	,97294	—	232,34	325,09	7,25	30,76	,3122
100 + 85	,94771	—	98,41	192,26	6,15	52,01	,5278	100 + 35	,97339	—	238,98	331,74	7,24	30,14	,3059
84	,94822	—	99,58	193,40	6,18	51,71	,5247	34	,97385	—	246,01	338,80	7,21	29,52	,2995
83	,94873	—	100,77	194,56	6,21	51,40	,5216	33	,97432	—	253,46	346,31	7,15	28,88	,2930
82	,94923	—	102,00	195,75	6,25	51,08	,5184	32	,97478	—	261,38	354,28	7,10	28,23	,2864
81	,94974	—	103,26	196,97	6,29	50,77	,5152	31	,97525	—	269,82	362,77	7,05	27,57	,2797
100 + 80	,95025	—	104,55	198,23	6,32	50,45	,5119	100 + 30	,97572	—	278,80	371,80	7,00	26,90	,2729
79	,95077	—	105,88	199,51	6,37	50,12	,5086	29	,97619	—	288,42	381,47	6,95	26,21	,2660
78	,95128	—	107,24	200,83	6,41	49,79	,5052	28	,97667	—	298,73	391,85	6,88	25,52	,2590
77	,95180	—	108,63	202,19	6,44	49,46	,5018	27	,97715	—	309,79	402,99	6,80	24,81	,2518
76	,95231	—	110,07	203,58	6,49	49,12	,4984	26	,97763	—	321,70	414,99	6,71	24,10	,2445
100 + 75	,95283	—	111,53	205,01	6,52	48,78	,4950	100 + 25	,97813	—	334,58	427,95	6,63	23,37	,2371
74	,95334	—	113,02	206,49	6,53	48,43	,4915	24	,97864	—	348,51	441,97	6,54	22,62	,2296
73	,95485	—	114,57	207,99	6,58	48,08	,4879	23	,97916	—	363,66	457,23	6,43	21,87	,2219
72	,95436	—	116,17	209,55	6,62	47,72	,4843	22	,97970	—	381,18	473,87	6,31	21,10	,2141
71	,95486	—	117,80	211,10	6,64	47,36	,4806	21	,98026	—	398,30	492,07	6,23	20,32	,2062
100 + 70	,95538	—	119,48	212,80	6,68	46,99	,4768	100 + 20	,98083	—	418,21	512,12	6,09	19,53	,1981
69	,95591	—	121,21	214,50	6,71	46,62	,4730	19	,98141	—	440,23	534,26	5,97	18,72	,1899
68	,95645	—	123,00	216,24	6,76	46,24	,4693	18	,98201	—	464,68	558,87	5,81	17,89	,1816
67	,95698	—	124,84	218,05	6,79	45,86	,4654	17	,98265	—	492,02	586,34	5,68	17,06	,1731
66	,95752	—	126,73	219,90	6,83	45,47	,4615	16	,98331	—	522,77	617,24	5,53	16,20	,1644
100 + 65	,95806	—	128,68	221,81	6,87	45,08	,4575	100 + 15	,98400	—	557,62	652,26	5,36	15,33	,1556
64	,95861	—	130,69	223,79	6,90	44,69	,4535	14	,98473	—	597,45	692,27	5,18	14,44	,1466
63	,95916	—	132,76	225,82	6,94	44,28	,4494	13	,98549	—	643,41	738,41	5,00	13,54	,1374
62	,95971	—	134,90	227,92	6,98	43,87	,4451	12	,98629	—	697,03	792,21	4,82	12,62	,1281
61	,96026	—	137,11	230,10	7,01	43,46	,4409	11	,98714	—	760,40	855,78	4,62	11,69	,1186
100 + 60	,96080	—	139,40	232,36	7,04	43,04	,4367	100 + 10	,98804	—	836,43	932,04	4,39	10,73	,1089
59	,96134	—	141,76	234,68	7,08	42,61	,4324	9	,98898	—	929,37	1025,20	4,17	9,75	,0990
58	,96187	—	144,20	237,09	7,11	42,18	,4280	8	,99000	—	1045,54	1141,61	3,93	8,76	,0889
57	,96241	—	146,74	239,60	7,14	41,74	,4235	7	,99107	—	1194,91	1291,21	3,70	7,74	,0786
56	,96294	—	149,36	242,19	7,17	41,29	,4191	6	,99221	—	1394,07	1490,61	3,46	6,71	,0681
100 + 55	,96346	—	152,07	244,87	7,20	40,84	,4144	100 + 5	,99342	—	1672,88	1769,69	3,19	5,65	,0573
54	,96399	—	154,86	247,65	7,21	40,38	,4098	4	,99473	—	2091,08	2188,19	2,89	4,57	,0464
53	,96451	—	157,78	250,55	7,23	39,91	,4050	3	,99612	—	2788,10	2885,49	2,61	3,46	,0352
52	,96504	—	160,82	253,57	7,25	39,44	,4002	2	,99761	—	4182,17	4279,81	2,36	2,34	,0237
51	,96555	—	163,99	256,70	7,29	38,95	,3953	1	,99920	—	8364,32	8464,24	2,08	1,18	,0120

TABLE I. HEAT 35°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83672	100	0,84	100,00	—	100,00	1,0142
1	,83904	—	0,84	100,72	0,12	99,28	1,0070
2	,84129	—	1,67	101,45	0,22	98,57	,9998
3	,84349	—	2,51	102,18	0,33	97,87	,9926
4	,84562	—	3,34	102,91	0,43	97,18	,9855
100 + 5	,84769	—	4,18	103,64	0,54	96,49	,9786
6	,84971	—	5,02	104,38	0,64	95,80	,9716
7	,85167	—	5,85	105,12	0,73	95,13	,9648
8	,85359	—	6,69	105,87	0,82	94,46	,9580
9	,85547	—	7,52	106,61	0,91	93,80	,9513
100 + 10	,85729	—	8,36	107,36	1,00	93,14	,9447
11	,85908	—	9,20	108,11	1,09	92,50	,9381
12	,86083	—	10,03	108,86	1,17	91,86	,9316
13	,86255	—	10,87	109,61	1,26	91,23	,9252
14	,86423	—	11,70	110,37	1,33	90,61	,9189
100 + 15	,86587	—	12,54	111,13	1,41	89 99	,9126
16	,86747	—	13,38	111,89	1,49	89,38	,9064
17	,86904	—	14,21	112,65	1,56	88,77	,9003
18	,87058	—	15,05	113,41	1,64	88,17	,8943
19	,87209	—	15,88	114,17	1,71	87,58	,8883
200 + 20	,87357	—	16,72	114,94	1,78	87,00	,8824
21	,87502	—	17,55	115,70	1,85	86,43	,8766
22	,87645	—	18,39	116,46	1,93	85,86	,8708
23	,87786	—	19,23	117,23	2,00	85,30	,8651
24	,87924	—	20,06	118,00	2,06	84,74	,8595
100 + 25	,88059	—	20,90	118,77	2,13	84,19	,8539
26	,88192	—	21,73	119,54	2,19	83,65	,8484
27	,88323	—	22,57	120,31	2,26	83,12	,8430
28	,88451	—	23,41	121,08	2,33	82,59	,8376
29	,88577	—	24,24	121,85	2,39	82,06	,8323
100 + 30	,88701	—	25,08	122,63	2,45	81,54	,8270
31	,88823	—	25,91	123,40	2,51	81,04	,8218
32	,88944	—	26,75	124,18	2,57	80,53	,8167
33	,89063	—	27,59	124,95	2,64	80,03	,8117
34	,89179	—	28,42	125,73	2,69	79,54	,8067
100 + 35	,89294	—	29,26	126,50	2,76	79,05	,8017
36	,89407	—	30,10	127,28	2,82	78,57	,7968
37	,89517	—	30,93	128,05	2,88	78,09	,7920
38	,89626	—	31,77	128,83	2,94	77,62	,7872
39	,89733	—	32,60	129,61	2,99	77,15	,7825
100 + 40	,89839	—	33,44	130,39	3,05	76,69	,7778
41	,89943	—	34,27	131,17	3,10	76,24	,7732
42	,90046	—	35,11	131,95	3,16	75,79	,7686
43	,90147	—	35,95	132,73	3,22	75,34	,7641
44	,90247	—	36,78	133,51	3,27	74,90	,7596
100 + 45	,90345	—	37,62	134,29	3,33	74,47	,7552
46	,90441	—	38,45	135,07	3,38	74,04	,7509
47	,90536	—	39,29	135,86	3,43	73,61	,7466
48	,90629	—	40,13	136,64	3,49	73,19	,7423
49	,90721	—	40,96	137,42	3,54	72,77	,7380

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90811	100	41,80	138,21	3,59	72,35	,7338
51	,90900	—	42,63	138,99	3,64	71,94	,7297
52	,90987	—	43,47	139,78	3,69	71,54	,7256
53	,91073	—	44,30	140,57	3,73	71,14	,7215
54	,91158	—	45,14	141,36	3,78	70,74	,7175
100 + 55	,91241	—	45,98	142,14	3,84	70,35	,7135
56	,91323	—	46,81	142,93	3,88	69,96	,7096
57	,91404	—	47,65	143,72	3,93	69,58	,7057
58	,91483	—	48,49	144,51	3,98	69,20	,7018
59	,91561	—	49,32	145,30	4,02	68,82	,6980
100 + 60	,91640	—	50,16	146,09	4,07	68,45	,6942
61	,91716	—	50,99	146,88	4,11	68,08	,6905
62	,91791	—	51,83	147,67	4,16	67,72	,6868
63	,91865	—	52,67	148,46	4,21	67,36	,6831
64	,91937	—	53,50	149,26	4,24	67,00	,6795
100 + 65	,92009	—	54,34	150,05	4,29	66,65	,6760
66	,92080	—	55,17	150,84	4,33	66,30	,6724
67	,92150	—	56,01	151,64	4,37	65,95	,6689
68	,92219	—	56,85	152,43	4,42	65,60	,6654
69	,92287	—	57,68	153,22	4,46	65,26	,6619
100 + 70	,92355	—	58,52	154,02	4,50	64,93	,6585
71	,92422	—	59,35	154,81	4,54	64,60	,6551
72	,92488	—	60,19	155,61	4,58	64,27	,6518
73	,92552	—	61,02	156,40	4,62	63,94	,6485
74	,92616	—	61,86	157,20	4,66	63,62	,6452
100 + 75	,92680	—	62,70	157,99	4,71	63,30	,6419
76	,92743	—	63,53	158,79	4,74	62,98	,6387
77	,92805	—	64,37	159,59	4,78	62,66	,6355
78	,92866	—	65,20	160,38	4,82	62,35	,6324
79	,92926	—	66,04	161,18	4,86	62,05	,6293
100 + 80	,92986	—	66,88	161,97	4,91	61,74	,6262
81	,93045	—	67,71	162,76	4,95	61,44	,6231
82	,93103	—	68,55	163,56	4,99	61,14	,6201
83	,93161	—	69,38	164,36	5,02	60,84	,6170
84	,93218	—	70,22	165,16	5,06	60,55	,6140
100 + 85	,93274	—	71,06	165,95	5,11	60,26	,6111
86	,93329	—	71,89	166,75	5,14	59,97	,6082
87	,93383	—	72,73	167,55	5,18	59,68	,6053
88	,93436	—	73,56	168,35	5,21	59,40	,6024
89	,93489	—	74,40	169,15	5,25	59,12	,5995
100 + 90	,93541	—	75,24	169,95	5,29	58,84	,5967
91	,93592	—	76,07	170,76	5,31	58,56	,5939
92	,93642	—	76,91	171,56	5,35	58,29	,5911
93	,93692	—	77,74	172,36	5,38	58,02	,5884
94	,93741	—	78,58	173,16	5,42	57,75	,5857
100 + 95	,93790	—	79,42	173,96	5,46	57,48	,5830
96	,93838	—	80,24	174,76	5,48	57,22	,5803
97	,93885	—	81,07	175,56	5,51	56,96	,5777
98	,93932	—	81,91	176,36	5,55	56,70	,5751
99	,93979	—	82,75	177,17	5,58	56,44	,5725

TABLE II. HEAT 35°.

I. Water and spirit by weight.	II. Specific gravity.	III Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,94025	100	83,60	177,98	5,62	56,18	,5698
99	,94070	—	84,45	178,80	5,65	55,93	,5672
98	,94115	—	85,31	179,64	5,67	55,67	,5646
97	,94159	—	86,19	180,49	5,70	55,40	,5619
96	,94204	—	87,09	181,35	5,74	55,14	,5593
100 + 95	,94249	—	88,00	182,23	5,77	54,87	,5566
94	,94295	—	88,93	183,13	5,80	54,60	,5538
93	,94342	—	89,89	184,05	5,84	54,33	,5510
92	,94389	—	90,87	185,00	5,87	54,05	,5482
91	,94436	—	91,87	185,97	5,90	53,77	,5454
100 + 90	,94484	—	92,89	186,95	5,94	53,49	,5425
89	,94533	—	93,93	187,96	5,97	53,20	,5396
88	,94583	—	94,99	188,99	6,00	52,91	,5367
87	,94633	—	96,09	190,05	6,04	52,62	,5337
86	,94683	—	97,21	191,13	6,08	52,32	,5307
100 + 85	,94734	—	98,35	192,23	6,12	52,02	,5276
84	,94785	—	99,52	193,37	6,15	51,71	,5245
83	,94835	—	100,72	194,53	6,19	51,40	,5214
82	,94886	—	101,95	195,72	6,23	51,09	,5182
81	,94937	—	103,20	196,94	6,26	50,78	,5150
100 + 80	,94988	—	104,49	198,20	6,29	50,46	,5117
79	,95040	—	105,82	199,48	6,34	50,13	,5084
78	,95091	—	107,18	200,80	6,38	49,80	,5051
77	,95143	—	108,57	202,16	6,41	49 47	,5017
76	,95194	—	110,00	203,55	6,45	49,13	,4983
100 + 75	,95246	—	111,46	204,98	6,48	48,79	,4948
74	,95297	—	112,96	206,45	6,51	48,44	,4913
73	,95348	—	114,51	207,96	6,55	48,09	,4877
72	,95399	—	116,10	209,52	6,58	47,73	,4841
71	,95450	—	117,74	211,13	6,61	47,37	,4804
100 + 70	,95502	—	119,42	212,77	6,65	47,00	,4767
69	,95555	—	121,15	214,46	6,69	46,63	,4729
68	,95609	—	122,93	216,21	6,72	46,25	,4691
67	,95663	—	124,77	218,01	6,76	45,87	,4652
66	,95717	—	126,66	219,86	6,80	45,48	,4613
100 + 65	,95772	—	128,61	221,77	6,84	45,09	,4573
64	,95827	—	130,62	223,74	6,88	44,70	,4533
63	,95882	—	132,69	225,77	6,92	44,29	,4492
62	,95938	—	134,83	227,88	6,95	43,88	,4450
61	,95993	—	137,04	230,06	6,98	43,47	,4408
100 + 60	,96048	—	139,32	232,31	7,01	43,05	,4366
59	,96102	—	141,68	234,63	7,05	42,62	,4322
58	,96155	—	144,12	237,04	7,08	42,19	,4278
57	,96209	—	146,66	239,55	7,11	41,75	,4234
56	,96262	—	149,28	242,14	7,14	41,30	,4189
100 + 55	,96315	—	151,99	244,82	7,17	40,85	,4143
54	,96368	—	154,78	247,60	7,18	40,39	,4096
53	,96421	—	157,69	250,50	7,19	39,92	,4049
52	,96474	—	160,73	253,51	7,22	39,45	,4001
51	,96526	—	163,92	256,65	7,25	38,96	,3952

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96579	100	167,19	259,91	7,28	38,47	,3902
49	,96632	—	170,61	263,30	7,31	37,98	,3852
48	,96684	—	174,16	266,83	7,33	37,48	,3801
47	,96737	—	177,86	270,52	7,34	36,97	,3750
46	,96789	—	181,73	274,37	7,36	36,45	,3697
100 + 45	,96840	—	185,77	278,40	7,37	35,92	,3643
44	,96890	—	189,99	282,62	7,37	35,38	,3588
43	,96940	—	194,41	287,04	7,37	34,83	,3533
42	,96989	—	199,04	291,67	7,37	34,28	,3477
41	,97038	—	203,89	296,53	7,36	33,72	,3420
100 + 40	,97086	—	208,99	301,64	7,35	33,15	,3362
39	,97133	—	214,35	307,02	7,33	32,57	,3303
38	,97180	—	219,99	312,69	7,30	31,98	,3244
37	,97226	—	225,94	318,67	7,27	31,38	,3183
36	,97273	—	232,21	324,98	7,23	30,77	,3121
100 + 35	,97319	—	238,85	331,63	7,22	30,15	,3058
34	,97366	—	245,87	338,68	7,19	29,53	,2995
33	,97413	—	253,32	346,19	7,13	28,89	,2930
32	,97460	—	261,24	354,16	7,08	28,24	,2864
31	,97508	—	269,67	362,63	7,04	27,58	,2797
100 + 30	,97556	—	278,65	371,66	6,99	26,91	,2729
29	,97603	—	288,20	381,33	6,93	26,22	,2660
28	,97652	—	298,56	391,70	6,86	25,53	,2590
27	,97701	—	309,62	402,84	6,78	24,82	,2518
26	,97750	—	321,52	414,83	6,69	24,11	,2445
100 + 25	,97801	—	334,39	427,77	6,62	23,38	,2371
24	,97853	—	348,32	441,79	6,53	22,63	,2296
23	,97906	—	363,46	457,03	6,43	21,88	,2219
22	,97961	—	379,97	473,66	6,31	21,11	,2141
21	,98018	—	398,08	491,85	6,23	20,33	,2062
100 + 20	,98076	—	417,98	511,88	6,10	19,54	,1981
19	,98135	—	439,98	534,01	5,97	18,73	,1899
18	,98196	—	464,42	558,59	5,83	17,90	,1816
17	,98260	—	491,74	586,06	5,68	17,06	,1731
16	,98327	—	522,48	616,94	5,54	16,21	,1644
100 + 15	,98397	—	557,31	651,94	5,37	15,34	,1556
14	,98470	—	597,12	691,92	5,20	14,45	,1466
13	,98547	—	643,05	738,03	5,02	13,55	,1374
12	,98628	—	696,64	791,80	4,84	12,63	,1281
11	,98714	—	759,97	855,33	4,64	11,69	,1186
100 + 10	,98804	—	835,96	931,55	4,41	10,73	,1089
9	,98899	—	928,85	1024,65	4,20	9,76	,0990
8	,99000	—	1044,95	1140,99	3 96	8,77	,0889
7	,99108	—	1194,23	1290,51	3,72	7,75	,0786
6	,99222	—	1393,28	1489,79	3,49	6,71	,0681
100 + 5	,99344	—	1671,93	1768,71	3,22	5,65	,0573
4	,99474	—	2089,91	2186,98	2,93	4,57	,0464
3	,99613	—	2786,55	2883,90	2,65	3,47	,0352
2	,99762	—	4179,82	4277,44	2,38	2,34	,0237
1	,99921	—	8359,64	8457,55	2,09	1,18	,0120

TABLE I. HEAT 36°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83627	100	—	100,00	—	100,00	1,0137	100 + 50	,90768	100	41,78	138,20	3,58	72,36	,7335
1	,83858	—	0,84	100,72	0,12	99,28	1,0065	51	,90857	—	42,61	138,98	3,63	71,95	,7294
2	,84082	—	1,67	101,45	0,22	98,57	,9993	52	,90944	—	43,44	139,77	3,67	71,55	,7253
3	,84303	—	2,51	102,18	0,33	97,87	,9921	53	,91030	—	44,28	140,56	3,72	71,15	,7212
4	,84510	—	3,34	102,91	0,43	97,18	,9850	54	,91115	—	45,12	141,34	3,78	70,75	,7172
100 + 5	,84723	—	4,18	103,64	0,54	96,49	,9780	100 + 55	,91198	—	45,96	142,13	3,83	70,36	,7132
6	,84926	—	5,02	104,38	0,64	95,80	,9711	56	,91280	—	46,78	142,92	3,86	69,97	,7093
7	,85122	—	5,85	105,12	0,73	95,13	,9643	57	,91362	—	47,62	143,71	3,91	69,59	,7054
8	,85314	—	6,69	105,87	0,82	94,46	,9575	58	,91441	—	48,46	144,49	3,97	69,21	,7015
9	,85502	—	7,52	106,61	0,91	93,80	,9508	59	,91519	—	49,29	145,28	4,01	68,83	,6977
100 + 10	,85684	—	8,36	107,36	1,00	93,14	,9442	100 + 60	,91598	—	50,13	146,07	4,06	68,46	,6939
11	,85863	—	9,19	108,11	1,08	92,50	,9377	61	,91674	—	50,96	146,86	4,10	68,09	,6902
12	,86038	—	10,02	108,86	1,16	91,86	,9312	62	,91748	—	51,80	147,66	4,14	67,72	,6865
13	,86210	—	10,86	109,61	1,25	91,23	,9248	63	,91823	—	52,64	148,44	4,20	67,37	,6828
14	,86378	—	11,69	110,37	1,32	90,61	,9185	64	,91895	—	53,47	149,24	4,23	67,00	,6792
100 + 15	,86541	—	12,53	111,13	1,40	89,99	,9122	100 + 65	,91967	—	54,31	150,03	4,28	66,65	,6756
16	,86701	—	13,37	111,89	1,48	89,38	,9060	66	,92039	—	55,14	150,82	4,32	66,30	,6721
17	,86859	—	14,20	112,64	1,56	88,77	,8999	67	,92109	—	55,98	151,62	4,36	65,96	,6686
18	,87013	—	15,04	113,41	1,63	88,17	,8939	68	,92178	—	56,81	152,41	4,40	65,61	,6651
19	,87164	—	15,87	114,17	1,70	87,59	,8879	69	,92246	—	57,64	153,20	4,44	65,27	,6616
100 + 20	,87313	—	16,71	114,94	1,77	87,01	,8819	100 + 70	,92315	—	58,48	154,00	4,48	64,93	,6582
21	,87458	—	17,54	115,70	1,84	86,43	,8761	71	,92381	—	59,31	154,80	4,51	64,61	,6549
22	,87601	—	18,38	116,46	1,92	85,86	,8703	72	,92447	—	60,15	155,59	4,56	64,27	,6515
23	,87742	—	19,22	117,23	1,99	85,30	,8647	73	,92511	—	60,98	156,38	4,60	63,94	,6482
24	,87880	—	20,05	117,99	2,06	84,74	,8591	74	,92576	—	61,82	157,18	4,64	63,62	,6449
100 + 25	,88015	—	20,89	118,77	2,12	84,19	,8535	100 + 75	,92640	—	62,66	157,97	4,69	63,31	,6416
26	,88148	—	21,72	119,53	2,19	83,65	,8480	76	,92702	—	63,50	158,77	4,73	62,98	,6384
27	,88279	—	22,56	120,30	2,26	83,12	,8426	77	,92764	—	64,33	159,57	4,76	62,67	,6352
28	,88407	—	23,40	121,08	2,32	82,59	,8372	78	,92825	—	65,16	160,36	4,80	62,36	,6321
29	,88533	—	24,23	121,85	2,38	82,06	,8319	79	,92885	—	66,00	161,16	4,84	62,05	,6291
100 + 30	,88657	—	25,07	122,63	2,44	81,55	,8266	100 + 80	,92946	—	66,84	161,95	4,89	61,75	,6259
31	,88779	—	25,90	123,40	2,50	81,04	,8214	81	,93005	—	67,67	162,74	4,93	61,45	,6229
32	,88900	—	26,74	124,18	2,56	80,53	,8163	82	,93063	—	68,51	163,54	4,97	61,14	,6199
33	,89019	—	27,58	124,95	2,63	80,03	,8113	83	,93121	—	69,34	164,35	4,99	60,84	,6168
34	,89135	—	28,41	125,72	2,69	79,54	,8063	84	,93178	—	70,18	165,14	5,04	60,56	,6138
100 + 35	,89250	—	29,24	126,50	2,74	79,05	,8013	100 + 85	,93234	—	71,02	165,94	5,08	60,26	,6109
36	,89363	—	30,08	127,27	2,81	78,57	,7965	86	,93289	—	71,85	166,74	5,11	59,97	,6080
37	,89473	—	30,91	128,05	2,86	78,09	,7917	87	,93343	—	72,69	167,54	5,15	59,69	,6051
38	,89582	—	31,75	128,82	2,93	77,62	,7869	88	,93397	—	73,52	168,34	5,18	59,40	,6022
39	,89689	—	32,58	129,60	2,98	77,15	,7821	89	,93450	—	74,36	169,14	5,22	59,12	,5993
100 + 40	,89795	—	33,42	130,38	3,04	76,69	,7775	100 + 90	,93501	—	75,20	169,94	5,26	58,85	,5965
41	,89899	—	34,25	131,16	3,09	76,24	,7728	91	,93553	—	76,02	170,74	5,28	58,57	,5937
42	,90002	—	35,09	131,94	3,15	75,79	,7683	92	,93603	—	76,86	171,54	5,32	58,29	,5909
43	,90103	—	35,93	132,72	3,21	75,34	,7638	93	,93653	—	77,70	172,35	5,35	58,02	,5882
44	,90204	—	36,76	133,50	3,26	74,90	,7593	94	,93702	—	78,53	173,15	5,38	57,75	,5855
100 + 45	,90302	—	37,60	134,28	3,32	74,47	,7549	100 + 95	,93751	—	79,37	173,94	5,43	57,49	,5827
46	,90397	—	38,43	135,06	3,37	74,04	,7505	96	,93799	—	80,19	174,74	5,45	57,23	,5801
47	,90493	—	39,27	135,85	3,42	73,61	,7463	97	,93846	—	81,02	175,54	5,48	56,97	,5775
48	,90586	—	40,10	136,63	3,47	73,19	,7420	98	,93893	—	81,86	176,34	5,52	56,70	,5749
49	,90678	—	40,94	137,41	3,53	72,77	,7377	99	,93939	—	82,70	177,14	5,56	56,45	,5722

TABLE II. HEAT 36°.

I. Water and Spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93986	100	83,55	177,95	5,60	56,19	,5696	100 + 50	,96550	100	167,09	259,85	7,24	38,48	,3901
99	,94030	—	84,40	178,77	5,63	55,93	,5669	49	,96604	—	170,51	263,23	7,28	37,99	,3851
98	,94076	—	85,26	179,61	5,65	55,67	,5643	48	,96656	—	174,06	266,76	7,30	37,48	,3800
97	,94120	—	86,14	180,46	5,68	55,41	,5617	47	,96710	—	177,76	270,45	7,31	36,98	,3749
96	,94165	—	87,04	181,32	5,72	55,15	,5591	46	,96762	—	181,63	274,30	7,33	36,46	,3696
100 + 95	,94210	—	87,95	182,20	5,75	54,88	,5563	100 + 45	,96814	—	185,66	278,33	7,33	35,92	,3642
94	,94257	—	88,88	183,11	5,77	54,61	,5536	44	,96864	—	189,88	282,54	7,34	35,39	,3588
93	,94304	—	89,84	184,02	5,82	54,34	,5508	43	,96915	—	194,30	286,96	7,34	34,84	,3533
92	,94351	—	90,82	184,97	5,85	54,06	,5480	42	,96964	—	198,93	291,59	7,34	34,29	,3477
91	,94398	—	91,81	185,94	5,87	53,78	,5452	41	,97014	—	203,77	296,44	7,33	33,73	,3420
100 + 90	,94446	—	92,84	186,92	5,92	53,50	,5423	100 + 40	,97063	—	208,87	301,55	7,32	33,16	,3361
89	,94496	—	93,87	187,94	5,93	53,21	,5394	39	,97110	—	214,23	306,92	7,31	32,58	,3303
88	,94546	—	94,94	188,96	5,98	52,92	,5365	38	,97158	—	219,86	312,59	7,27	31,99	,3243
87	,94596	—	96,04	190,03	6,01	52,63	,5335	37	,97205	—	225,81	318,56	7,25	31,39	,3182
86	,94646	—	97,15	191,11	6,04	52,33	,5305	36	,97253	—	232,08	324,86	7,22	30,78	,3121
100 + 85	,94696	—	98,30	192,21	6,09	52,03	,5274	100 + 35	,97300	—	238,71	331,52	7,19	30,16	,3058
84	,94748	—	99,46	193,34	6,12	51,72	,5243	34	,97347	—	245,73	338,56	7,17	29,54	,2994
83	,94798	—	100,66	194,50	6,16	51,41	,5212	33	,97395	—	253,18	346,06	7,12	28,90	,2929
82	,94849	—	101,89	195,69	6,20	51,09	,5180	32	,97442	—	261,09	354,03	7,06	28,25	,2863
81	,94900	—	103,14	196,91	6,23	50,79	,5148	31	,97491	—	269,52	362,50	7,02	27,59	,2796
100 + 80	,94950	—	104,43	198,17	6,26	50,47	,5115	100 + 30	,97540	—	278,49	371,52	6,97	26,92	,2728
79	,95003	—	105,76	199,45	6,31	50,13	,5082	29	,97587	—	288,10	381,18	6,92	26,23	,2659
78	,95054	—	107,12	200,77	6,35	49,80	,5049	28	,97637	—	298,39	391,55	6,84	25,54	,2589
77	,95106	—	108,51	202,13	6,38	49,47	,5015	27	,97687	—	309,44	402,67	6,77	24,83	,2518
76	,95157	—	109,94	203,52	6,42	49,13	,4981	26	,97737	—	321,34	414,66	6,68	24,11	,2445
100 + 75	,95208	—	111,39	204,94	6,45	48,79	,4946	100 + 25	,97789	—	334,20	427,59	6,61	23,39	,2371
74	,95261	—	112,89	206,41	6,48	48,45	,4911	24	,97841	—	348,12	441,60	6,52	22,64	,2296
73	,95312	—	114,44	207,92	6,52	48,09	,4875	23	,97895	—	363,26	456,83	6,43	21,89	,2219
72	,95364	—	116,03	209,48	6,55	47,73	,4839	22	,97951	—	379,76	473,45	6,31	21,12	,2141
71	,95415	—	117,67	211,09	6,58	47,38	,4803	21	,98009	—	397,86	491,63	6,23	20,34	,2062
100 + 70	,95468	—	119,35	212,73	6,62	47,01	,4765	100 + 20	,98068	—	417,75	511,64	6,11	19,54	,1981
69	,95521	—	121,08	214,42	6,66	46,64	,4728	19	,98128	—	439,73	533,76	5,97	18,73	,1899
68	,95575	—	122,86	216,17	6,69	46,26	,4690	18	,98189	—	464,16	558,32	5,84	17,91	,1816
67	,95629	—	124,70	217,97	6,73	45,88	,4651	17	,98254	—	491,47	585,77	5,70	17,07	,1731
66	,95683	—	126,59	219,82	6,77	45,49	,4612	16	,98322	—	522,19	616,64	5,55	16,21	,1644
100 + 65	,95738	—	128,54	221,73	6,81	45,10	,4572	100 + 15	,98393	—	557,00	651,61	5,39	15,34	,1556
64	,95793	—	130,54	223,70	6,84	44,70	,4532	14	,98466	—	596,79	691,57	5,22	14,46	,1466
63	,95848	—	132,61	225,73	6,88	44,29	,4491	13	,98544	—	642,69	737,65	5,04	13,56	,1374
62	,95904	—	134,75	227,84	6,91	43,89	,4449	12	,98625	—	696,25	791,39	4,86	12,63	,1281
61	,95959	—	136 96	230,01	6,95	43,48	,4407	11	,98712	—	759,55	854,88	4,67	11,70	,1186
100 + 60	,96014	—	139,24	232,26	6,98	43,05	,4364	100 + 10	,98803	—	835,50	931,05	4,45	10,74	,1089
59	,96069	—	141,60	234,59	7,01	42,63	,4321	9	,98898	—	928,33	1024,10	4,23	9,76	,0990
58	,96123	—	144,04	236,99	7,05	42,20	,4277	8	,98999	—	1044,37	1140,38	3,99	8,77	,0889
57	,96177	—	146,58	239,50	7,08	41,76	,4233	7	,99108	—	1193,57	1289,81	3,76	7,75	,0786
56	,96231	—	149,19	242,09	7,10	41,31	,4188	6	,99222	—	1392,51	1488,98	3,53	6,72	,0681
100 + 55	,96283	—	151,90	244,76	7,14	40,85	,4141	100 + 5	,99344	—	1671,01	1767,74	3,27	5,66	,0573
54	,96338	—	154,69	247,55	7,14	40,40	,4095	4	,99475	—	2088,75	2185,78	2,97	4,57	,0464
53	,96391	—	157,60	250,45	7,15	39,93	,4048	3	,99614	—	2785,00	2882,31	2,69	3,47	,0352
52	,96445	—	160,64	253,46	7,18	39,45	,4000	2	,99764	—	4177,50	4275,07	2,43	2,34	,0237
51	,96497	—	163,81	256,59	7,22	38,97	,3951	1	,99923	—	8354,99	8452,87	2,12	1,18	,0120

TABLE I. HEAT 37°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83582	100	—	100,00	—	100,00	1,0131	100 + 50	,90725	100	41,75	138,19	3,56	72,36	,7331
1	,83812	—	0,84	100,72	0,12	99,28	1,0060	51	,90814	—	42,58	138,97	3,61	71,95	,7291
2	,84036	—	1,67	101,45	0,22	98,57	,9988	52	,90901	—	43,42	139,76	3,66	71,55	,7249
3	,84256	—	2,51	102,18	0,33	97,87	,9916	53	,90987	—	44,25	140,55	3,70	71,15	,7208
4	,84470	—	3,34	102,91	0,43	97,18	,9845	54	,91072	—	45,09	141,33	3,76	70,75	,7169
100 + 5	,84677	—	4,18	103,64	0,54	96,49	,9775	100 + 55	,91155	—	45,93	142,12	3,81	70,36	,7129
6	,84880	—	5,01	104,38	0,63	95,80	,9706	56	,91237	—	46,76	142,91	3,85	69,97	,7090
7	,85077	—	5,85	105,12	0,73	95,13	,9638	57	,91320	—	47,59	143,70	3,89	69,59	,7051
8	,85269	—	6,68	105,87	0,81	94,46	,9570	58	,91399	—	48,43	144,48	3,95	69,21	,7012
9	,85458	—	7,51	106,61	0,90	93,80	,9503	59	,91477	—	49,26	145,27	3,99	68,83	,6974
100 + 10	,85639	—	8,35	107,36	0,99	93,15	,9437	100 + 60	,91556	—	50,10	146,06	4,04	68,46	,6936
11	,85818	—	9,19	108,11	1,08	92,50	,9372	61	,91632	—	50,93	146,85	4,08	68,09	,6899
12	,85993	—	10,02	108,86	1,16	91,86	,9307	62	,91706	—	51,77	147,65	4,12	67,73	,6862
13	,86165	—	10,86	109,61	1,25	91,23	,9243	63	,91781	—	52,61	148,43	4,18	67,37	,6825
14	,86333	—	11,69	110,37	1,32	90,61	,9180	64	,91853	—	53,44	149,23	4,21	67,01	,6789
100 + 15	,86496	—	12,53	111,12	1,41	89,99	,9117	100 + 65	,91925	—	54,28	150,02	4,26	66,66	,6753
16	,86656	—	13,37	111,88	1,49	89,38	,9055	66	,91997	—	55,11	150,81	4,30	66,31	,6718
17	,86814	—	14,19	112,64	1,55	88,78	,8994	67	,92068	—	55,95	151,61	4,34	65,96	,6683
18	,86968	—	15,03	113,40	1,63	88,18	,8934	68	,92137	—	56,78	152,40	4,38	65,61	,6648
19	,87120	—	15,86	114,16	1,70	87,59	,8874	69	,92205	—	57,61	153,19	4,42	65,27	,6614
100 + 20	,87268	—	16,70	114,93	1,77	87,01	,8815	100 + 70	,92274	—	58,45	153,99	4,46	64,94	,6579
21	,87413	—	17,53	115,69	1,84	86,43	,8757	71	,92340	—	59,28	154,78	4,50	64,61	,6546
22	,87556	—	18,37	116,45	1,92	85,86	,8699	72	,92406	—	60,11	155,58	4,53	64,28	,6512
23	,87697	—	19,21	117,22	1,99	85,30	,8642	73	,92470	—	60,95	156,37	4,58	63,95	,6479
24	,87835	—	20,04	117,99	2,05	84,75	,8586	74	,92536	—	61,79	157,17	4,62	63,63	,6446
100 + 25	,87971	—	20,88	118,76	2,12	84,20	,8530	100 + 75	,92599	—	62,63	157,96	4,67	63,31	,6414
26	,88103	—	21,71	119,53	2,18	83,66	,8476	76	,92661	—	63,46	158,75	4,71	62,99	,6382
27	,88235	—	22,55	120,30	2,25	83,13	,8422	77	,92723	—	64,29	159,55	4,74	62,67	,6349
28	,88303	—	23,38	121,07	2,31	82,60	,8368	78	,92784	—	65,13	160,34	4,79	62,36	,6318
29	,88489	—	24,22	121,84	2,38	82,07	,8315	79	,92844	—	65,97	161,14	4,83	62,06	,6288
100 + 30	,88613	—	25,05	122,62	2,43	81,55	,8262	100 + 80	,92906	—	66,80	161,93	4,87	61,75	,6256
31	,88735	—	25,88	123,39	2,49	81,05	,8210	81	,92965	—	67,63	162,73	4,90	61,45	,6226
32	,88856	—	26,72	124,17	2,55	80,54	,8159	82	,93023	—	68,47	163,53	4,94	61,15	,6196
33	,88975	—	27,56	124,95	2,61	80,04	,8109	83	,93080	—	69,31	164,33	4,98	60,85	,6166
34	,89091	—	28,39	125,72	2,67	79,55	,8059	84	,93138	—	70,14	165,13	5,01	60,56	,6136
100 + 35	,89205	—	29,23	126,49	2,74	79,06	,8010	100 + 85	,93194	—	70,98	165,92	5,06	60,27	,6106
36	,89318	—	30,07	127,27	2,80	78,58	,7961	86	,93249	—	71,81	166,72	5,09	59,98	,6077
37	,89429	—	30,90	128,04	2,86	78,10	,7913	87	,93303	—	72,65	167,52	5,13	59,70	,6048
38	,89538	—	31,73	128,82	2,91	77,62	,7865	88	,93357	—	73,48	168,32	5,16	59,41	,6019
39	,89645	—	32,56	129,60	2,96	77,16	,7817	89	,93410	—	74,32	169,12	5,20	59,13	,5991
100 + 40	,89750	—	33,40	130,38	3,02	76,70	,7771	100 + 90	,93461	—	75,15	169,92	5,23	58,85	,5962
41	,89855	—	34,23	131,15	3,08	76,25	,7725	91	,93513	—	75,98	170,72	5,26	58,57	,5934
42	,89958	—	35,07	131,93	3,14	75,80	,7679	92	,93563	—	76,82	171,52	5,30	58,30	,5906
43	,90059	—	35,91	132,71	3,20	75,35	,7634	93	,93613	—	77,65	172,33	5,32	58,03	,5879
44	,90160	—	36,74	133,49	3,25	74,91	,7590	94	,93663	—	78,49	173,13	5,36	57,76	,5852
100 + 45	,90259	—	37,57	134,27	3,30	74,48	,7545	100 + 95	,93712	—	79,33	173,93	5,40	57,49	,5825
46	,90353	—	38,41	135,05	3,36	74,04	,7502	96	,93760	—	80,15	174,72	5,43	57,24	,5799
47	,90450	—	39,25	135,84	3,41	73,62	,7460	97	,93807	—	80,98	175,52	5,46	56,97	,5772
48	,90543	—	40,08	136,62	3,46	73,20	,7417	98	,93854	—	81,82	176,32	5,50	56,71	,5746
49	,90635	—	40,92	137,40	3,52	72,78	,7373	99	,93900	—	82,66	177,12	5,54	56,46	,5719

TABLE II. HEAT 37°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93947	100	83,51	177,93	5,58	56,19	,5694	100 + 50	,96522	100	167,00	259,79	7,21	38,49	,3900
99	,93991	—	84,36	178,75	5,61	55,94	,5667	49	,96575	—	170,41	263,17	7,24	38,00	,3850
98	,94037	—	85,22	179,59	5,63	55,68	,5641	48	,96628	—	173,96	266,69	7,27	37,49	,3799
97	,94082	—	86,10	180,44	5,66	55,42	,5615	47	,96682	—	177,66	270,38	7,28	36,98	,3748
96	,94127	—	86,99	181,30	5,69	55,16	,5588	46	,96734	—	181,53	274,23	7,30	36,46	,3695
100 + 95	,94172	—	87,90	182,18	5,72	54,88	,5561	100 + 45	,96787	—	185,56	278,26	7,30	35,93	,3641
94	,94219	—	88,83	183,08	5,75	54,62	,5534	44	,96838	—	189,77	282,46	7,31	35,40	,3587
93	,94266	—	89,79	184,00	5,79	54,35	,5506	43	,96889	—	194,19	286,89	7,30	34,85	,3532
92	,94313	—	90,77	184,95	5,82	54,06	,5478	42	,96940	—	198,82	291,51	7,31	34,30	,3476
91	,94361	—	91,76	185,91	5,85	53,79	,5450	41	,96989	—	203,66	296,35	7,31	33,74	,3419
100 + 90	,94408	—	92,79	186,90	5,89	53,51	,5421	100 + 40	,97039	—	208,76	301,46	7,30	33,17	,3361
89	,94459	—	93,82	187,91	5,91	53,22	,5392	39	,97087	—	214,11	306,82	7,29	32,59	,3302
88	,94508	—	94,88	188,94	5,94	52,93	,5363	38	,97136	—	219,74	312,49	7,25	32,00	,3242
87	,94558	—	95,98	190,00	5,98	52,64	,5333	37	,97183	—	225,68	318,46	7,22	31,40	,3181
86	,94608	—	97,10	191,08	6,02	52,34	,5303	36	,97232	—	231,95	324,75	7,20	30,79	,3120
100 + 85	,94658	—	98,24	192,18	6,06	52,04	,5272	100 + 35	,97280	—	238,58	331,40	7,18	30,17	,3057
84	,94710	—	99,40	193,31	6,09	51,73	,5241	34	,97328	—	245,59	338,45	7,14	29,55	,2994
83	,94761	—	100,61	194,47	6,14	51,42	,5210	33	,97376	—	253,04	345,93	7,11	28,91	,2929
82	,94812	—	101,84	195,66	6,18	51,10	,5178	32	,97424	—	260,94	353,90	7,04	28,26	,2863
81	,94863	—	103,09	196,88	6,21	50,79	,5146	31	,97473	—	269,37	362,36	7,01	27,60	,2796
100 + 80	,94913	—	104,38	198,14	6,24	50,47	,5113	100 + 30	,97523	—	278,34	371,38	6,96	26,93	,2728
79	,94965	—	105,70	199,42	6,28	50,14	,5080	29	,97571	—	287,94	381,04	6,90	26,24	,2659
78	,95016	—	107,06	200,74	6,32	49,81	,5047	28	,97622	—	298,22	391,40	6,82	25,55	,2589
77	,95068	—	108,45	202,09	6,36	49,48	,5013	27	,97672	—	309,27	402,51	6,76	24,84	,2517
76	,95120	—	109,87	203,49	6,38	49,14	,4979	26	,97723	—	321,16	414,49	6,67	24,12	,2444
100 + 75	,95171	—	111,33	204,91	6,42	48,80	,4944	100 + 25	,97776	—	334,01	427,41	6,60	23,40	,2370
74	,95224	—	112,83	206,38	6,45	48,45	,4909	24	,97829	—	347,93	441,41	6,52	22,65	,2295
73	,95275	—	114,38	207,89	6,49	48,10	,4873	23	,97884	—	363,06	456,63	6,43	21,90	,2219
72	,95328	—	115,97	209,45	6,52	47,74	,4837	22	,97941	—	379,55	473,24	6,31	21,13	,2141
71	,95380	—	117,60	211,06	6,54	47,39	,4801	21	,97999	—	397,64	491,41	6,23	20,35	,2062
100 + 70	,95433	—	119,29	212,69	6,60	47,01	,4763	100 + 20	,98060	—	417,52	511,41	6,11	19,55	,1981
69	,95486	—	121,01	214,39	6,62	46,65	,4726	19	,98120	—	439,49	533,51	5,98	18,74	,1899
68	,95541	—	122,79	216,13	6,66	46,26	,4688	18	,98182	—	463,90	558,06	5,84	17,92	,1816
67	,95595	—	124,63	217,93	6,70	45,88	,4649	17	,98248	—	491,20	585,49	5,71	17,08	,1731
66	,95649	—	126,52	219,78	6,74	45,50	,4610	16	,98316	—	521,90	616,34	5,56	16,22	,1644
100 + 65	,95704	—	128,47	221,69	6,78	45,11	,4570	100 + 15	,98388	—	556,69	651,29	5,40	15,35	,1556
64	,95759	—	130,47	223,66	6,81	44,71	,4530	14	,98462	—	596,46	691,22	5,24	14,46	,1466
63	,95814	—	132,53	225,69	6,84	44,30	,4489	13	,98540	—	642,34	737,27	5,07	13,56	,1374
62	,95870	—	134,68	227,79	6,89	43,90	,4447	12	,98622	—	695,86	790,98	4,88	12,64	,1281
61	,95925	—	136,88	229,97	6,91	43,48	,4405	11	,98709	—	759,13	854,43	4,70	11,70	,1186
100 + 60	,95980	—	139,16	232,22	6,94	43,06	,4363	100 + 10	,98801	—	835,04	930,55	4,49	10,74	,1089
59	,96035	—	141,52	234,54	6,98	42,63	,4319	9	,98896	—	927,82	1023,55	4,27	9,77	,0990
58	,96090	—	143,96	236,94	7,02	42,20	,4275	8	,99098	—	1043,79	1139,77	4,02	8,78	,0889
57	,96144	—	146,49	239,45	7,04	41,76	,4231	7	,99107	—	1192,91	1289,11	3,80	7,76	,0786
56	,96199	—	149,11	242,04	7,07	41,31	,4186	6	,99223	—	1391,74	1488,17	3,57	6,72	,0681
100 + 55	,96252	—	151,81	244,71	7,10	40,86	,4140	100 + 5	,99344	—	1670,09	1766,78	3,31	5,66	,0573
54	,96307	—	154,60	247,49	7,11	40,40	,4093	4	,99475	—	2087,59	2184,58	3,01	4,58	,0464
53	,96361	—	157,51	250,39	7,12	39,93	,4046	3	,99615	—	2783,45	2880,72	2,73	3,47	,0352
52	,96415	—	160,55	253,40	7,15	39,46	,3998	2	,99765	—	4175,18	4272,71	2,47	2,34	,0237
51	,96467	—	163,72	256,52	7,20	38,98	,3949	1	,99924	—	8350,36	8448,20	2,16	1,18	,0120

TABLE I. HEAT 38°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83536	100	—	100,00	—	100,00	1,0126
1	,83766	—	0,83	100,72	0,11	99,28	1,0054
2	,83990	—	1,67	101,45	0,22	98,57	,9982
3	,84209	—	2,51	102,18	0,33	97,87	,9911
4	,84424	—	3,34	102,91	0,43	97,18	,9840
100 + 5	,84631	—	4,18	103,64	0,54	96,49	,9770
6	,84834	—	5,01	104,38	0,63	95,80	,9701
7	,85032	—	5,85	105,12	0,73	95,13	,9633
8	,85224	—	6,68	105,86	0,82	94,46	,9565
9	,85413	—	7,51	106,61	0,90	93,80	,9498
100 + 10	,85594	—	8,35	107,36	0,99	93,15	,9432
11	,85774	—	9,18	108,10	1,08	92,50	,9367
12	,85949	—	10,01	108,86	1,15	91,86	,9302
13	,86121	—	10,85	109,60	1,25	91,23	,9238
14	,86288	—	11,68	110,36	1,32	90,61	,9175
100 + 15	,86451	—	12,52	111,12	1,40	89,99	,9112
16	,86611	—	13,36	111,88	1,48	89,38	,9051
17	,86769	—	14,19	112,64	1,55	88,78	,8990
18	,86924	—	15,02	113,40	1,62	88,18	,8930
19	,87075	—	15,85	114,16	1,69	87,59	,8870
100 + 20	,87224	—	16,69	114,93	1,76	87,01	,8810
21	,87369	—	17,52	115,69	1,83	86,43	,8752
22	,87512	—	18,36	116,45	1,91	85,86	,8694
23	,87653	—	19,20	117,22	1,98	85,31	,8638
24	,87791	—	20,03	117,99	2,04	84,75	,8582
100 + 25	,87926	—	20,86	118,76	2,10	84,20	,8526
26	,88059	—	21,69	119,53	2,16	83,66	,8472
27	,88191	—	22,53	120,30	2,23	83,13	,8418
28	,88319	—	23,37	121,07	2,30	82,60	,8364
29	,88445	—	24,21	121,84	2,37	82,07	,8311
100 + 30	,88569	—	25,04	122,62	2,42	81,56	,8258
31	,88691	—	25,87	123,39	2,48	81,05	,8206
32	,88812	—	26,71	124,17	2,54	80,54	,8155
33	,88931	—	27,55	124,94	2,61	80,04	,8105
34	,89047	—	28,38	125,71	2,67	79,55	,8055
100 + 35	,89161	—	29,21	126,48	2,73	79,06	,8006
36	,89274	—	30,05	127,26	2,79	78,58	,7957
37	,89385	—	30,88	128,03	2,85	78,10	,7909
38	,89494	—	31,72	128,81	2,91	77,63	,7861
39	,89600	—	32,54	129,59	2,95	77,16	,7813
100 + 40	,89705	—	33,39	130,37	3,02	76,70	,7767
41	,89811	—	34,22	131,15	3,07	76,25	,7721
42	,89914	—	35,05	131,93	3,12	75,80	,7675
43	,90015	—	35,89	132,71	3,18	75,35	,7630
44	,90116	—	36,72	133,48	3,24	74,91	,7586
100 + 45	,90215	—	37,55	134,26	3,29	74,48	,7542
46	,90310	—	38,39	135,05	3,34	74,05	,7499
47	,90407	—	39,22	135,83	3,39	73,62	,7456
48	,90500	—	40,06	136,61	3,45	73,20	,7413
49	,90592	—	40,90	137,39	3,51	72,78	,7370

I. Spirit and water by weight.	II. Specific gravity.	III Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90682	100	41,73	138,18	3,55	72,37	,7328
51	,90771	—	42,56	138,96	3,60	71,96	,7287
52	,90858	—	43,39	139,75	3,64	71,56	,7246
53	,90944	—	44,23	140,54	3,69	71,16	,7205
54	,91029	—	45,07	141,32	3,75	70,76	,7165
100 + 55	,91112	—	45,91	142,11	3,80	70,37	,7125
56	,91194	—	46,73	142,90	3,83	69,98	,7086
57	,91277	—	47,57	143,69	3,88	69,60	,7047
58	,91357	—	48,40	144,47	3,93	69,22	,7009
59	,91435	—	49,24	145,26	3,98	68,84	,6971
100 + 60	,91513	—	50,07	146,05	4,02	68,47	,6933
61	,91590	—	50,90	146,84	4,06	68,10	,6896
62	,91664	—	51,74	147,63	4,11	67,74	,6859
63	,91739	—	52,58	148,42	4,16	67,38	,6822
64	,91811	—	53,41	149,21	4,20	67,02	,6786
100 + 65	,91883	—	54,25	150,00	4,25	66,66	,6750
66	,91955	—	55,08	150,79	4,29	66,31	,6715
67	,92027	—	55,92	151,59	4,33	65,97	,6680
68	,92096	—	56,75	152,38	4,37	65,62	,6645
69	,92164	—	57,58	153,17	4,41	65,28	,6611
100 + 70	,92233	—	58,42	153,97	4,45	64,95	,6576
71	,92300	—	59,25	154,77	4,48	64,62	,6543
72	,92365	—	60,08	155,56	4,52	64,29	,6509
73	,92430	—	60,92	156,35	4,57	63,96	,6476
74	,92495	—	61,75	157,15	4,60	63,64	,6443
100 + 75	,92558	—	62,59	157,94	4,65	63,32	,6411
76	,92620	—	63,43	158,73	4,70	63,00	,6379
77	,92682	—	64,26	159,53	4,73	62,68	,6340
78	,92743	—	65,09	160,32	4,77	62,37	,6315
79	,92802	—	65,93	161,12	4,81	62,07	,6285
100 + 80	,92865	—	66,76	161,91	4,85	61,76	,6254
81	,92924	—	67,59	162,71	4,88	61,46	,6223
82	,92982	—	68,43	163,51	4,92	61,16	,6193
83	,93039	—	69,27	164,31	4,96	60,86	,6163
84	,93098	—	70,10	165,11	4,99	60,57	,6133
100 + 85	,93154	—	70,94	165,90	5,04	60,28	,6103
86	,93209	—	71,77	166,70	5,07	59,99	,6075
87	,93263	—	72,61	167,50	5,11	59,70	,6046
88	,93317	—	73,44	168,30	5,14	59,42	,6017
89	,93370	—	74,28	169,10	5,18	59,14	,5988
100 + 90	,93421	—	75,11	169,90	5,21	58,86	,5900
91	,93473	—	75,94	170,70	5,24	58,58	,5932
92	,93523	—	76,78	171,50	5,28	58,31	,5904
93	,93573	—	77,61	172,31	5,30	58,04	,5877
94	,93623	—	78,45	173,11	5,34	57,77	,5849
100 + 95	,93672	—	79,28	173,91	5,37	57,50	,5823
96	,93720	—	80,10	174,70	5,40	57,24	,5796
97	,93767	—	80,93	175,50	5,43	56,98	,5770
98	,93814	—	81,77	176,30	5,47	56,72	,5744
99	,93860	—	82,61	177,10	5,51	56,46	,5717

TABLE II. HEAT 38°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93907	100	83,46	177,91	5,55	56,20	,5691
99	,93952	—	84,31	178,73	5,58	55,95	,5665
98	,93998	—	85,17	179,56	5,61	55,69	,5639
97	,94043	—	86,05	180,41	5,64	55,42	,5613
96	,94088	—	86,94	181,27	5,67	55,16	,5586
100 + 95	,94134	—	87,85	182,15	5,70	54,89	,5559
94	,94181	—	88,78	183,05	5,73	54,62	,5532
93	,94228	—	89,74	183,97	5,77	54,36	,5504
92	,94275	—	90,71	184,92	5,79	54,08	,5476
91	,94323	—	91,71	185,89	5,82	53,80	,5447
100 + 90	,94370	—	92,73	186,87	5,86	53,51	,5418
89	,94421	—	93,77	187,88	5,89	53,22	,5390
88	,94470	—	94,83	188,91	5,92	52,93	,5361
87	,94520	—	95,93	189,97	5,96	52,64	,5331
86	,94571	—	97,04	191,05	5,99	52,35	,5301
100 + 85	,94621	—	98,19	192,15	6,04	52,04	,5270
84	,94673	—	99,35	193,28	6,07	51,74	,5239
83	,94724	—	100,55	194,44	6,11	51,43	,5208
82	,94775	—	101,78	195,63	6,15	51,11	,5176
81	,94826	—	103,03	196,85	6,18	50,80	,5144
100 + 80	,94876	—	104,32	198,11	6,21	50,48	,5111
79	,94928	—	105,64	199,39	6,25	50,15	,5078
78	,94979	—	107,00	200,71	6,29	49,82	,5045
77	,95031	—	108,39	202,06	6,33	49,49	,5011
76	,95083	—	109,81	203,46	6,35	49,15	,4977
100 + 75	,95134	—	111,27	204,88	6,39	48,81	,4942
74	,95187	—	112,77	206,35	6,42	48,46	,4907
73	,95239	—	114,32	207,86	6,46	48,11	,4871
72	,95292	—	115,91	209,41	6,50	47,75	,4835
71	,95345	—	117,54	211,02	6,52	47,40	,4799
100 + 70	,95398	—	119,22	212,65	6,57	47,02	,4761
69	,95451	—	120,94	214,35	6,59	46,65	,4724
68	,95506	—	122,72	216,09	6,63	46,27	,4686
67	,95560	—	124,56	217,89	6,67	45,89	,4647
66	,95615	—	126,45	219,74	6,71	45,51	,4608
100 + 65	,95670	—	128,40	221,65	6,75	45,12	,4568
64	,95725	—	130,40	223,62	6,78	44,72	,4528
63	,95780	—	132,46	225,65	6,81	44,31	,4487
62	,95836	—	134,60	227,74	6,86	43,91	,4446
61	,95891	—	136,81	229,92	6,89	43,49	,4404
100 + 60	,95947	—	139,08	232,17	6,91	43,07	,4361
59	,96002	—	141,44	234,49	6,95	42,64	,4318
58	,96057	—	143,88	236,89	6,99	42,21	,4274
57	,96112	—	146,41	239,40	7,01	41,77	,4230
56	,96167	—	149,03	241,99	7,04	41,32	,4185
100 + 55	,96221	—	151,73	244,66	7,07	40,87	,4139
54	,96276	—	154,52	247,44	7,08	40,41	,4092
53	,96331	—	157,42	250,33	7,09	39,94	,4045
52	,96385	—	160,46	253,34	7,12	39,47	,3997
51	,96438	—	163,63	256,46	7,17	38,99	,3948

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96493	100	166,91	259,73	7,18	38,50	,3899
49	,96546	—	170,31	263,10	7,21	38,01	,3849
48	,96600	—	173,86	266,62	7,24	37,51	,3798
47	,96654	—	177,56	270,31	7,25	37,00	,3747
46	,96707	—	181,43	274,16	7,27	36,47	,3694
100 + 45	,96760	—	185,46	278,19	7,27	35,94	,3640
44	,96812	—	189,67	282,39	7,28	35,41	,3586
43	,96863	—	194,08	286,81	7,27	34,86	,3531
42	,96915	—	198,71	291,43	7,28	34,31	,3475
41	,96965	—	203,55	296,27	7,28	33,75	,3418
100 + 40	,97015	—	208,64	301,37	7,27	33,18	,3360
39	,97064	—	213,99	306,73	7,26	32,60	,3301
38	,97114	—	219,62	312,39	7,23	32,01	,3242
37	,97162	—	225,55	318,35	7,20	31,41	,3181
36	,97211	—	231,82	324,64	7,18	30,80	,3119
100 + 35	,97260	—	238,45	331,29	7,16	30,18	,3056
34	,97309	—	245,45	338,33	7,12	29,56	,2993
33	,97357	—	252,90	345,81	7,09	28,92	,2928
32	,97406	—	260,80	353,76	7,04	28,27	,2862
31	,97456	—	269,22	362,23	6,99	27,61	,2795
100 + 30	,97506	—	278,19	371,24	6,95	26,94	,2727
29	,97555	—	287,78	380,89	6,89	26,25	,2658
28	,97607	—	298,06	391,25	6,81	25,56	,2588
27	,97658	—	309,10	402,35	6,75	24,85	,2517
26	,97709	—	320,98	414,32	6,66	24,13	,2444
100 + 25	,97763	—	333,82	427,23	6,59	23,41	,2370
24	,97817	—	347,74	441,22	6,52	22,66	,2295
23	,97873	—	362,80	456,43	6,43	21,91	,2219
22	,97931	—	379,34	473,03	6,31	21,14	,2141
21	,97990	—	397,42	491,19	6,23	20,36	,2061
100 + 20	,98052	—	417,29	511,18	6,11	19,56	,1981
19	,98112	—	439,25	533,26	5,99	18,75	,1898
18	,98175	—	463,65	557,80	5,85	17,93	,1815
17	,98242	—	490,93	585,21	5,72	17,09	,1730
16	,98311	—	521,61	616,04	5,57	16,23	,1643
100 + 15	,98383	—	556,38	650,97	5,41	15,36	,1555
14	,98458	—	596,13	690,87	5,26	14,47	,1466
13	,98536	—	641,99	736,89	5,10	13,57	,1374
12	,98619	—	695,48	790,57	4,91	12,65	,1281
11	,98707	—	758,71	853,99	4,72	11,71	,1186
100 + 10	,98799	—	834,58	930,05	4,53	10,75	,1089
9	,98895	—	927,31	1023,01	4,30	9,77	,0990
8	,98997	—	1043,22	1139,16	4,06	8,78	,0889
7	,99107	—	1192,25	1288,41	3,84	7,76	,0786
6	,99223	—	1390,97	1487,36	3,61	6,72	,0681
100 + 5	,99344	—	1669,17	1765,82	3,35	5,66	,0573
4	,99476	—	2086,44	2183,38	3,06	4,58	,0464
3	,99616	—	2781,92	2879,13	2,79	3,47	,0352
2	,99766	—	4172,88	4270,35	2,53	2,34	,0237
1	,99925	—	8345,76	8443,54	2,22	1,18	,0120

TABLE I. HEAT 39°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83491	100	—	100,00	—	100,00	1,0120
1	,83720	—	0,83	100,72	0,11	99,28	1,0048
2	,83944	—	1,67	101,45	0,22	98,57	,9976
3	,84163	—	2,51	102,18	0,33	97,87	,9905
4	,84378	—	3,34	102,91	0,43	97,18	,9834
100 + 5	,84585	—	4,18	103,64	0,54	96,49	,9764
6	,84788	—	5,01	104,38	0,63	95,80	,9696
7	,84987	—	5,84	105,12	0,72	95,13	,9628
8	,85179	—	6,68	105,86	0,82	94,47	,9560
9	,85368	—	7,50	106,60	0,90	93,80	,9493
100 + 10	,85550	—	8,34	107,35	0,99	93,15	,9427
11	,85730	—	9,18	108,10	1,08	92,51	,9362
12	,85905	—	10,01	108,85	1,16	91,87	,9297
13	,86076	—	10,85	109,60	1,25	91,24	,9233
14	,86243	—	11,68	110,36	1,32	90,62	,9170
100 + 15	,86406	—	12,51	111,12	1,39	89,99	,9107
16	,86566	—	13,35	111,88	1,47	89,38	,9046
17	,86724	—	14,18	112,64	1,54	88,78	,8985
18	,86879	—	15,01	113,40	1,61	88,18	,8925
19	,87030	—	15,85	114,16	1,69	87,59	,8865
100 + 20	,87179	—	16,68	114,92	1,76	87,01	,8806
21	,87324	—	17,52	115,69	1,83	86,44	,8748
22	,87468	—	18,35	116,45	1,90	85,87	,8690
23	,87608	—	19,18	117,21	1,97	85,31	,8633
24	,87746	—	20,02	117,98	2,04	84,75	,8577
100 + 25	,87882	—	20,85	118,75	2,10	84,20	,8522
26	,88015	—	21,68	119,52	2,16	83,66	,8468
27	,88147	—	22,52	120,29	2,23	83,13	,8414
28	,88275	—	23,36	121,07	2,29	82,60	,8360
29	,88401	—	24,19	121,84	2,35	82,07	,8307
100 + 30	,88525	—	25,03	122,61	2,41	81,56	,8254
31	,88647	—	25,85	123,39	2,46	81,05	,8202
32	,88768	—	26,69	124,16	2,53	80,54	,8151
33	,88887	—	27,53	124,94	2,59	80,04	,8101
34	,89003	—	28,36	125,71	2,65	79,56	,8051
100 + 35	,89117	—	29,20	126,48	2,72	79,06	,8002
36	,89230	—	30,03	127,26	2,77	78,58	,7953
37	,89341	—	30,87	128,03	2,84	78,10	,7905
38	,89449	—	31,70	128,81	2,89	77,63	,7857
39	,89556	—	32,53	129,59	2,94	77,17	,7809
100 + 40	,89661	—	33,37	130,37	3,00	76,71	,7763
41	,89767	—	34,20	131,14	3,06	76,26	,7717
42	,89870	—	35,03	131,92	3,11	75,81	,7671
43	,89971	—	35,87	132,70	3,17	75,36	,7626
44	,90072	—	36,70	133,48	3,22	74,92	,7582
100 + 45	,90171	—	37,53	134,26	3,27	74,48	,7538
46	,90267	—	38,37	135,04	3,33	74,05	,7495
47	,90363	—	39,20	135,82	3,38	73,63	,7452
48	,90457	—	40,04	136,60	3,44	73,21	,7409
49	,90549	—	40,87	137,39	3,48	72,79	,7366

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90639	100	41,70	138,17	3,53	72,37	,7324
51	,90728	—	42,54	138,95	3,59	71,96	,7283
52	,90815	—	43,37	139,74	3,63	71,56	,7242
53	,90901	—	44,20	140,53	3,67	71,16	,7201
54	,90986	—	45,04	141,31	3,73	70,76	,7162
100 + 55	,91069	—	45,88	142,10	3,78	70,37	,7122
56	,91151	—	46,70	142,89	3,81	69,98	,7083
57	,91234	—	47,54	143,68	3,86	69,60	,7044
58	,91314	—	48,37	144,46	3,91	69,23	,7006
59	,91393	—	49,21	145,25	3,96	68,85	,6968
100 + 60	,91470	—	50,04	146,04	4,00	68,48	,6929
61	,91547	—	50,87	146,83	4,04	68,10	,6893
62	,91622	—	51,71	147,62	4,09	67,74	,6856
63	,91697	—	52,55	148,41	4,14	67,38	,6819
64	,91769	—	53,38	149,20	4,18	67,02	,6783
100 + 65	,91841	—	54,22	149,99	4,23	66,67	,6747
66	,91913	—	55,05	150,78	4,27	66,32	,6712
67	,91985	—	55,89	151,58	4,31	65,97	,6677
68	,92055	—	56,72	152,37	4,35	65,62	,6642
69	,92123	—	57,55	153,16	4,39	65,28	,6608
100 + 70	,92192	—	58,39	153,96	4,43	64,95	,6573
71	,92259	—	59,22	154,75	4,47	64,62	,6540
72	,92325	—	60,05	155,54	4,51	64,29	,6506
73	,92390	—	60,89	156,34	4,55	63,96	,6473
74	,92454	—	61,72	157,13	4,59	63,64	,6440
100 + 75	,92517	—	62,55	157,92	4,63	63,32	,6408
76	,92579	—	63,39	158,71	4,68	63,00	,6376
77	,92641	—	64,23	159,52	4,71	62,68	,6343
78	,92702	—	65,06	160,30	4,76	62,37	,6312
79	,92760	—	65,89	161,10	4,79	62,08	,6282
100 + 80	,92824	—	66,72	161,89	4,83	61,77	,6251
81	,92883	—	67,55	162,69	4,86	61,46	,6220
82	,92941	—	68,39	163,49	4,90	61,16	,6190
83	,92979	—	69,23	164,29	4,94	60,86	,6160
84	,93057	—	70,06	165,09	4,97	60,57	,6130
100 + 85	,93113	—	70,90	165,88	5,02	60,28	,6101
86	,93169	—	71,73	166,68	5,05	59,99	,6072
87	,93223	—	72,57	167,48	5,09	59,71	,6043
88	,93277	—	73,40	168,28	5,12	59,42	,6014
89	,93230	—	74,24	169,08	5,16	59,14	,5985
100 + 90	,93381	—	75,07	169,88	5,19	58,86	,5957
91	,93433	—	75,90	170,68	5,22	58,59	,5929
92	,93483	—	76,74	171,48	5,26	58,31	,5901
93	,93533	—	77,57	172,29	5,28	58,04	,5874
94	,93583	—	78,41	173,09	5,32	57,77	,5847
100 + 95	,93632	—	79,24	173,89	5,35	57,51	,5820
96	,93680	—	80,06	174,68	5,38	57,25	,5794
97	,93727	—	80,89	175,48	5,41	56,99	,5768
98	,93774	—	81,73	176,28	5,45	56,72	,5742
99	,93821	—	82,57	177,08	5,49	56,47	,5715

TABLE II.

HEAT 39°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93867	100	83,42	177,89	5,53	56,21	,5689
99	,93913	—	84,27	178,71	5,56	55,95	,5662
98	,93959	—	85,13	179,54	5,59	55,69	,5636
97	,94005	—	86,00	180,39	5,61	55,43	,5610
96	,94050	—	86,89	181,25	5,64	55,17	,5583
100 + 95	,94096	—	87,80	182,12	5,68	54,90	,5557
94	,94143	—	88,73	183,02	5,71	54,63	,5530
93	,94190	—	89,69	183,95	5,74	54,36	,5502
92	,94237	—	90,66	184,90	5,76	54,08	,5474
91	,94285	—	91,66	185,86	5,80	53,80	,5445
100 + 90	,94332	—	92,68	186,84	5,84	53,52	,5416
89	,94383	—	93,72	187,85	5,87	53,23	,5388
88	,94433	—	94,78	188,88	5,90	52,94	,5359
87	,94483	—	95,87	189,94	5,93	52,65	,5329
86	,94534	—	96,99	191,02	5,97	52,36	,5299
100 + 85	,94584	—	98,13	192,12	6,01	52,05	,5268
84	,94636	—	99,29	193,25	6,04	51,75	,5237
83	,94687	—	100,50	194,41	6,09	51,44	,5206
82	,94738	—	101,72	195,60	6,12	51,12	,5174
81	,94789	—	102,97	196,82	6,15	50,80	,5142
100 + 80	,94839	—	104,27	198,08	6,19	50,49	,5109
79	,94891	—	105,58	199,36	6,22	50,16	,5076
78	,94942	—	106,94	200,68	6,26	49,83	,5043
77	,94994	—	108,33	202,03	6,30	49,50	,5009
76	,95046	—	109,75	203,43	6,32	49,15	,4975
100 + 75	,95097	—	111,21	204,85	6,36	48,81	,4940
74	,95150	—	112,71	206,32	6,39	48,47	,4905
73	,95203	—	114,26	207,82	6,44	48,12	,4869
72	,95256	—	115,85	209,38	6,47	47,76	,4833
71	,95310	—	117,48	210,98	6,50	47,40	,4797
100 + 70	,95363	—	119,15	212,61	6,54	47,03	,4760
69	,95417	—	120,87	214,31	6,56	46,66	,4722
68	,95472	—	122,65	216,05	6,60	46,28	,4684
67	,95526	—	124,49	217,85	6,64	45,90	,4646
66	,95581	—	126,38	219,70	6,68	45,52	,4607
100 + 65	,95636	—	128,33	221,61	6,72	45,13	,4567
64	,95691	—	130,33	223,58	6,75	44,73	,4527
63	,95746	—	132,39	225,60	6,79	44,32	,4486
62	,95802	—	134,52	227,70	6,82	43,91	,4445
61	,95857	—	136,73	229,88	6,85	43,50	,4403
100 + 60	,95913	—	139,00	232,12	6,88	43,08	,4360
59	,95969	—	141,36	234,44	6,92	42,65	,4317
58	,96024	—	143,80	236,84	6,96	42,22	,4273
57	,96080	—	146,33	239,35	6,98	41,78	,4229
56	,96135	—	148,95	241,94	7,01	41,33	,4184
100 + 55	,96190	—	151,65	244,61	7,04	40,88	,4137
54	,96245	—	154,44	247,38	7,06	40,42	,4091
53	,96301	—	157,34	250,27	7,07	39,95	,4044
52	,96355	—	160,37	253,28	7,09	39,48	,3996
51	,96409	—	163,54	256,40	7,14	39,00	,3947

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96465	100	166,82	259,67	7,15	38,51	,3897
49	,96517	—	170,22	263,03	7,19	38,02	,3848
48	,96572	—	173,77	266,55	7,22	37,51	,3797
47	,96626	—	177,46	270,24	7,22	37,01	,3746
46	,96680	—	181,33	274,09	7,24	36,48	,3693
100 + 45	,96733	—	185,36	278,12	7,24	35,95	,3639
44	,96786	—	189,57	282,32	7,25	35,42	,3585
43	,96838	—	193,98	286,73	7,25	34,87	,3530
42	,96890	—	198,60	291,34	7,26	34,32	,3474
41	,96941	—	203,44	296,19	7,25	33,76	,3417
100 + 40	,96991	—	208,53	301,28	7,25	33,19	,3359
39	,97041	—	213,87	306,64	7,23	32,61	,3300
38	,97092	—	219,50	312,29	7,21	32,02	,3241
37	,97141	—	225,43	318,25	7,18	31,42	,3180
36	,97191	—	231,69	324,53	7,16	30,81	,3119
100 + 35	,97240	—	238,32	331,18	7,14	30,19	,3056
34	,97290	—	245,32	338,21	7,11	29,57	,2993
33	,97339	—	252,76	345,69	7,07	28,93	,2928
32	,97388	—	260,66	353,63	7,03	28,28	,2862
31	,97439	—	269,07	362,09	6,98	27,62	,2795
100 + 30	,97489	—	278,04	371,10	6,94	26,95	,2727
29	,97539	—	287,62	380,75	6,87	26,26	,2658
28	,97592	—	297,90	391,09	6,81	25,57	,2588
27	,97644	—	308,93	402,19	6,74	24,86	,2517
26	,97696	—	320,81	414,15	6,66	24,14	,2443
100 + 25	,97750	—	333,64	427,05	6,59	23,41	,2370
24	,97805	—	347,55	441,04	6,51	22,67	,2295
23	,97862	—	362,66	456,24	6,42	21,92	,2218
22	,97921	—	379,14	472,82	6,32	21,15	,2140
21	,97981	—	397,20	490,97	6,23	20,37	,2061
100 + 20	,98043	—	417,06	510,95	6,11	19,57	,1981
19	,98104	—	439,01	533,01	6,00	18,76	,1898
18	,98168	—	463,40	557,54	5,86	17,94	,1815
17	,98236	—	490,66	584,93	5,73	17,10	,1730
16	,98306	—	521,32	615,74	5,58	16,24	,1643
100 + 15	,98378	—	556,08	650,05	5,43	15,37	,1555
14	,98454	—	595,80	690,53	5,27	14,48	,1466
13	,98533	—	641,64	736,51	5,13	13,58	,1374
12	,98616	—	695,10	790,17	4,93	12,65	,1281
11	,98705	—	758,29	853,55	4,74	11,71	,1186
100 + 10	,98797	—	834,12	929,56	4,56	10,76	,1089
9	,98894	—	926,80	1022,47	4,33	9,78	,0990
8	,98996	—	1042,65	1138,55	4,10	8,78	,0889
7	,99106	—	1191,60	1287,72	3,88	7,77	,0786
6	,99223	—	1390,20	1486,55	3,65	6,73	,0681
100 + 5	,99344	—	1668,25	1764,86	3,39	5,67	,0573
4	,99476	—	2085,30	2182,19	3,11	4,58	,0464
3	,99616	—	2780,39	2877,55	2,84	3,47	,0352
2	,99766	—	4170,59	4268,01	2,58	2,34	,0237
1	,99925	—	8341,18	8438,90	2,28	1,18	,0120

TABLE I. HEAT 40°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of Bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83445	100	—	100,00	—	100,00	1,0114	100 + 50	,90596	100	41,68	138,16	3,52	72,38	,7321
1	,83674	—	0,83	100,72	0,11	99,28	1,0042	51	,90685	—	42,52	138,95	3,57	71,97	,7280
2	,83898	—	1,67	101,45	0,22	98,57	,9970	52	,90772	—	43,35	139,73	3,62	71,57	,7239
3	,84117	—	2,50	102,18	0,32	97,87	,9899	53	,90858	—	44,18	140,52	3,66	71,17	,7198
4	,84331	—	3,33	102,91	0,42	97,18	,9829	54	,90943	—	45,02	141,30	3,72	70,77	,7158
100 + 5	,84539	—	4,17	103,64	0,53	96,49	,9759	100 + 55	,91026	—	45,85	142,09	3,76	70,38	,7118
6	,84742	—	5,00	104,38	0,62	95,81	,9690	56	,91109	—	46,68	142,88	3,80	69,99	,7079
7	,84941	—	5,84	105,12	0,72	95,13	,9622	57	,91191	—	47,52	143,67	3,85	69,61	,7040
8	,85134	—	6,67	105,86	0,81	94,47	,9555	58	,91271	—	48,35	144,45	3,90	69,23	,7002
9	,85323	—	7,50	106,60	0,90	93,81	,9488	59	,91350	—	49,19	145,24	3,95	68,85	,6964
100 + 10	,85507	—	8,34	107,35	0,99	93,16	,9422	100 + 60	,91428	—	50,02	146,03	3,99	68,48	,6926
11	,85686	—	9,17	108,10	1,07	92,51	,9357	61	,91504	—	50,85	146,82	4,03	68,11	,6889
12	,85860	—	10,00	108,85	1,15	91,87	,9292	62	,91579	—	51,69	147,61	4,08	67,75	,6852
13	,86031	—	10,84	109,60	1,24	91,24	,9228	63	,91654	—	52,52	148,40	4,12	67,39	,6816
14	,86198	—	11,67	110,36	1,31	90,62	,9165	64	,91727	—	53,35	149,19	4,16	67,03	,6780
100 + 15	,86361	—	12,50	111,12	1,38	90,00	,9103	100 + 65	,91799	—	54,19	149,98	4,21	66,67	,6744
16	,86521	—	13,34	111,87	1,47	89,38	,9041	66	,91871	—	55,02	150,77	4,25	66,32	,6708
17	,86679	—	14,17	112,63	1,54	88,78	,8980	67	,91943	—	55,86	151,57	4,29	65,98	,6673
18	,86834	—	15,01	113,39	1,62	88,19	,8920	68	,92013	—	56,69	152,36	4,33	65,63	,6639
19	,86985	—	15,84	114,15	1,69	87,60	,8860	69	,92082	—	57,52	153,15	4,37	65,29	,6605
100 + 20	,87134	—	16,67	114,92	1,75	87,02	,8801	100 + 70	,92151	—	58,36	153,94	4,42	64,96	,6570
21	,87280	—	17,51	115,68	1,83	86,44	,8743	71	,92218	—	59,19	154,73	4,46	64,63	,6537
22	,87423	—	18,34	116,45	1,89	85,87	,8686	72	,92284	—	60,02	155,53	4,49	64,30	,6503
23	,87564	—	19,17	117,21	1,96	85,31	,8629	73	,92349	—	60,86	156,32	4,54	63,97	,6470
24	,87702	—	20,01	117,98	2,03	84,76	,8573	74	,92413	—	61,69	157,11	4,58	63,65	,6437
100 + 25	,87838	—	20,84	118,75	2,09	84,21	,8518	100 + 75	,92476	—	62,52	157,91	4,61	63,33	,6405
26	,87971	—	21,67	119,52	2,15	83,67	,8463	76	,92538	—	63,36	158,70	4,66	63,01	,6373
27	,88102	—	22,51	120,29	2,22	83,14	,8409	77	,92600	—	64,19	159,50	4,69	62,69	,6341
28	,88231	—	23,34	121,06	2,28	82,61	,8355	78	,92661	—	65,03	160,29	4,74	62,38	,6310
29	,88357	—	24,18	121,83	2,35	82,08	,8302	79	,92722	—	65,86	161,09	4,77	62,08	,6279
100 + 30	,88481	—	25,01	122,61	2,40	81,57	,8250	100 + 80	,92783	—	66,69	161,88	4,81	61,77	,6248
31	,88603	—	25,84	123,38	2,46	81,06	,8198	81	,92842	—	67,52	162,68	4,84	61,47	,6217
32	,88723	—	26,68	124,16	2,52	80,55	,8147	82	,92900	—	68,36	163,48	4,88	61,17	,6187
33	,88842	—	27,51	124,93	2,58	80,05	,8097	83	,92958	—	69,19	164,27	4,92	60,87	,6157
34	,88959	—	28,35	125,70	2,65	79,56	,8047	84	,93016	—	70,03	165,07	4,96	60,58	,6127
100 + 35	,89073	—	29,18	126,47	2,71	79,07	,7998	100 + 85	,93072	—	70,86	165,86	5,00	60,29	,6098
36	,89185	—	30,01	127,25	2,76	78,59	,7949	86	,93128	—	71,69	166,66	5,03	60,00	,6069
37	,89296	—	30,85	128,02	2,83	78,11	,7901	87	,93183	—	72,53	167,46	5,07	59,72	,6040
38	,89404	—	31,68	128,80	2,88	77,64	,7853	88	,93237	—	73,36	168,26	5,10	59,43	,6011
39	,89511	—	32,51	129,58	2,93	77,17	,7806	89	,93290	—	74,20	169,06	5,14	59,15	,5983
100 + 40	,89617	—	33,35	130,36	2,99	76,71	,7759	100 + 90	,93341	—	75,03	169,86	5,17	58,87	,5955
41	,89722	—	34,18	131,13	3,05	76,26	,7713	91	,93393	—	75,86	170,66	5,20	58,60	,5927
42	,89825	—	35,01	131,91	3,10	75,81	,7667	92	,93443	—	76,70	171,46	5,24	58,32	,5899
43	,89927	—	35,85	132,69	3,16	75,36	,7622	93	,93493	—	77,53	172,27	5,26	58,05	,5872
44	,90028	—	36,68	133,47	3,21	74,92	,7578	94	,93543	—	78,37	173,07	5,30	57,78	,5845
100 + 45	,90127	—	37,51	134,25	3,26	74,49	,7534	100 + 95	,93592	—	79,20	173,87	5,33	57,52	,5818
46	,90224	—	38,35	135,03	3,32	74,06	,7491	96	,93640	—	80,02	174,66	5,36	57,26	,5791
47	,90319	—	39,18	135,81	3,37	73,63	,7448	97	,93687	—	80,85	175,46	5,39	56,99	,5765
48	,90413	—	40,02	136,59	3,43	73,21	,7405	98	,93734	—	81,69	176,26	5,43	56,73	,5739
49	,90505	—	40,85	137,38	3,47	72,79	,7363	99	,93781	—	82,52	177,06	5,46	56,48	,5713

TABLE II. HEAT 40°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93827	100	83,37	177,87	5,50	56,22	,5686
99	,93873	—	84,22	178,69	5,53	55,96	,5660
98	,93919	—	85,08	179,52	5,56	55,70	,5634
97	,93965	—	85,96	180,37	5,59	55,44	,5608
96	,94012	—	86,85	181,23	5,62	55,18	,5581
100 + 95	,94058	—	87,76	182,10	5,66	54,91	,5554
94	,94105	—	88,69	183,00	5,69	54,64	,5527
93	,94152	—	89,64	183,93	5,71	54,37	,5499
92	,94199	—	90,61	184,87	5,74	54,09	,5471
91	,94247	—	91,61	185,83	5,78	53,81	,5443
100 + 90	,94295	—	92,63	186,82	5,81	53,53	,5414
89	,94345	—	93,67	187,82	5,85	53,24	,5385
88	,94395	—	94,73	188,85	5,88	52,95	,5356
87	,94445	—	95,82	189,91	5,91	52,66	,5326
86	,94496	—	96,94	190,99	5,95	52,36	,5296
100 + 85	,94547	—	98,08	192,09	5,99	52,06	,5265
84	,94598	—	99,24	193,22	6,02	51,75	,5235
83	,94649	—	100,44	194,38	6,06	51,44	,5204
82	,94700	—	101,67	195,57	6,10	51,13	,5172
81	,94751	—	102,92	196,79	6,13	50,81	,5140
100 + 80	,94802	—	104,21	198,05	6,16	50,49	,5107
79	,94853	—	105,53	199,33	6,20	50,17	,5074
78	,94904	—	106,88	200,65	6,23	49,84	,5041
77	,94956	—	108,27	202,00	6,27	49,50	,5007
76	,95008	—	109,69	203,39	6,30	49,16	,4973
100 + 75	,95060	—	111,15	204,82	6,33	48,82	,4938
74	,95113	—	112,65	206,28	6,37	48,48	,4903
73	,95166	—	114,20	207,79	6,41	48,12	,4867
72	,95220	—	115,79	209,34	6,45	47,77	,4831
71	,95274	—	117,42	210,94	6,48	47,41	,4795
100 + 70	,95328	—	119,09	212,58	6,51	47,04	,4758
69	,95382	—	120,81	214,27	6,54	46,67	,4720
68	,95437	—	122,59	216,01	6,58	46,29	,4682
67	,95492	—	124,42	217,81	6,61	45,91	,4644
66	,95547	—	126,31	219,66	6,65	45,53	,4605
100 + 65	,95602	—	128,26	221,57	6,69	45,14	,4565
64	,95657	—	130,26	223,53	6,73	44,74	,4525
63	,95712	—	132,32	225,56	6,76	44,33	,4484
62	,95768	—	134,45	227,66	6,79	43,92	,4443
61	,95823	—	136,66	229,84	6,82	43,51	,4401
100 + 60	,95879	—	138,94	232,08	6,86	43,09	,4358
59	,95935	—	141,29	234,40	6,89	42,66	,4315
58	,95991	—	143,73	236,80	6,93	42,23	,4271
57	,96047	—	146,25	239,30	6,95	41,79	,4227
56	,96103	—	148,87	241,89	6,98	41,34	,4182
100 + 55	,96159	—	151,57	244,56	7,01	40,89	,4136
54	,96214	—	154,36	247,33	7,03	40,43	,4089
53	,96270	—	157,26	250,22	7,04	39,96	,4042
52	,96325	—	160,29	253,22	7,07	39,49	,3994
51	,96379	—	163,45	256,34	7,11	39,01	,3945

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96434	100	166,73	259,59	7,14	38,52	,3896
49	,96489	—	170,13	262,97	7,16	38,03	,3846
48	,96544	—	173,68	266,49	7,19	37,52	,3795
47	,96598	—	177,37	270,17	7,20	37,02	,3744
46	,96652	—	181,23	274,02	7,21	36,49	,3691
100 + 45	,96706	—	185,26	278,04	7,22	35,96	,3638
44	,96759	—	189,47	282,24	7,23	35,43	,3584
43	,96812	—	193,88	286,65	7,23	34,88	,3529
42	,96864	—	198,49	291,26	7,23	34,33	,3473
41	,96910	—	203,33	296,10	7,23	33,77	,3416
100 + 40	,96967	—	208,42	301,19	7,23	33,20	,3358
39	,97018	—	213,76	306,55	7,21	32,62	,3299
38	,97069	—	219,38	312,19	7,19	32,03	,3240
37	,97119	—	225,31	318,14	7,17	31,43	,3179
36	,97170	—	231,57	324,42	7,15	30,82	,3118
100 + 35	,97220	—	238,19	331,06	7,13	30,21	,3055
34	,97270	—	245,19	338,09	7,10	29,58	,2992
33	,97320	—	252,62	345,57	7,05	28,94	,2927
32	,97370	—	260,52	353,50	7,02	28,29	,2861
31	,97421	—	268,92	361,95	6,97	27,63	,2794
100 + 30	,97472	—	277,89	370,97	6,92	26,96	,2726
29	,97523	—	287,47	380,60	6,87	26,27	,2657
28	,97576	—	297,74	390,93	6,81	25,58	,2587
27	,97629	—	308,76	402,03	6,73	24,87	,2516
26	,97682	—	320,64	413,98	6,66	24,15	,2443
100 + 25	,97737	—	333,46	426,88	6,58	23,42	,2369
24	,97793	—	347,36	440,86	6,50	22,68	,2294
23	,97851	—	362,46	456,05	6,41	21,93	,2218
22	,97910	—	378,94	472,62	6,32	21,16	,2140
21	,97971	—	396,98	490,76	6,22	20,37	,2061
100 + 20	,98033	—	416,83	510,72	6,11	19,58	,1980
19	,98096	—	438,77	532,77	6,00	18,77	,1898
18	,98161	—	463,15	557,28	5,87	17,94	,1815
17	,98229	—	490,39	584,65	5,74	17,10	,1730
16	,98300	—	521,04	615,44	5,60	16,25	,1643
100 + 15	,98373	—	555,78	650,33	5,45	15,38	,1555
14	,98449	—	595,47	690,19	5,28	14,49	,1466
13	,98529	—	641,28	736,14	5,14	13,58	,1374
12	,98613	—	694,72	789,77	4,95	12,66	,1281
11	,98702	—	757,87	853,11	4,76	11,72	,1186
100 + 10	,98795	—	833,66	929,07	4,59	10,76	,1089
9	,98892	—	926,29	1021,93	4,36	9,78	,0990
8	,98995	—	1042,08	1137,94	4,14	8,79	,0889
7	,99105	—	1190,95	1287,03	3,92	7,77	,0786
6	,99222	—	1389,44	1485,75	3,69	6,73	,0681
100 + 5	,99345	—	1667,33	1703,90	3,43	5,67	,0573
4	,99476	—	2084,16	2181,00	3,16	4,59	,0464
3	,99616	—	2778,87	2875,98	2,89	3,48	,0352
2	,99766	—	4168,31	4265,67	2,64	2,34	,0237
1	,99925	—	8336,63	8434,27	2,36	1,18	,0120

TABLE I. HEAT 41°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83399	100	—	100,00	—	100,00	1,0109	100 + 50	,90553	100	41,66	138,15	3,51	72,39	,7317
1	,83628	—	0,83	100,72	0,11	99,28	1,0037	51	,90642	—	42,50	138,94	3,56	71,97	,7277
2	,83853	—	1,67	101,45	0,22	98,57	,9965	52	,90729	—	43,33	139,72	3,61	71,57	,7236
3	,84072	—	2,50	102,18	0,32	97,87	,9894	53	,90815	—	44,15	140,50	3,65	71,17	,7195
4	,84286	—	3,33	102,91	0,42	97,18	,9824	54	,90900	—	44,99	141,29	3,70	70,78	,7155
100 + 5	,84493	—	4,17	103,64	0,53	96,49	,9754	100 + 55	,90984	—	45,82	142,07	3,75	70,39	,7115
6	,84697	—	5,00	104,38	0,62	95,81	,9685	56	,91066	—	46,65	142,86	3,79	70,00	,7076
7	,84895	—	5,84	105,12	0,72	95,13	,9617	57	,91148	—	47,49	143,65	3,84	69,61	,7037
8	,85088	—	6,67	105,86	0,81	94,47	,9550	58	,91228	—	48,32	144,43	3,89	69,23	,6999
9	,85277	—	7,50	106,60	0,90	93,81	,9483	59	,91307	—	49,16	145,22	3,94	68,86	,6961
100 + 10	,85461	—	8,34	107,35	0,99	93,16	,9417	100 + 60	,91385	—	49,99	146,01	3,98	68,49	,6923
11	,85640	—	9,17	108,10	1,07	92,51	,9352	61	,91461	—	50,82	146,80	4,02	68,12	,6886
12	,85814	—	10,00	108,85	1,15	91,87	,9288	62	,91536	—	51,66	147,59	4,07	67,75	,6849
13	,85985	—	10,84	109,60	1,24	91,24	,9224	63	,91611	—	52,49	148,38	4,11	67,39	,6813
14	,86152	—	11,67	110,36	1,31	90,62	,9160	64	,91684	—	53,32	149,17	4,15	67,03	,6777
100 + 15	,86315	—	12,49	111,12	1,37	90,00	,9098	100 + 65	,91756	—	54,16	149,96	4,20	66,68	,6741
16	,86476	—	13,33	111,87	1,46	89,38	,9037	66	,91828	—	54,99	150,75	4,24	66,33	,6705
17	,86634	—	14,17	112,63	1,54	88,78	,8976	67	,91900	—	55,82	151,55	4,27	65,98	,6670
18	,86789	—	15,00	113,39	1,61	88,19	,8916	68	,91971	—	56,65	152,34	4,31	65,64	,6636
19	,86940	—	15,83	114,15	1,68	87,60	,8856	69	,92040	—	57,49	153,13	4,36	65,29	,6602
100 + 20	,87088	—	16,66	114,92	1,74	87,02	,8797	100 + 70	,92109	—	58,32	153,92	4,40	64,97	,6567
21	,87235	—	17,50	115,68	1,82	86,44	,8739	71	,92176	—	59,15	154,71	4,44	64,64	,6534
22	,87378	—	18,33	116,44	1,89	85,87	,8681	72	,92242	—	59,98	155,51	4,47	64,30	,6500
23	,87519	—	19,16	117,21	1,95	85,31	,8625	73	,92307	—	60,82	156,30	4,52	63,98	,6467
24	,87657	—	20,00	117,98	2,02	84,76	,8569	74	,92371	—	61,65	157,10	4,55	63,65	,6435
100 + 25	,87793	—	20,83	118,74	2,09	84,21	,8513	100 + 75	,92434	—	62,48	157,89	4,59	63,34	,6402
26	,87926	—	21,66	119,51	2,15	83,67	,8459	76	,92496	—	63,32	158,68	4,64	63,01	,6370
27	,88057	—	22,50	120,28	2,22	83,14	,8405	77	,92558	—	64,15	159,49	4,66	62,70	,6338
28	,88186	—	23,33	121,06	2,27	82,61	,8351	78	,92619	—	64,99	160,27	4,72	62,39	,6307
29	,88312	—	24,17	121,83	2,34	82,08	,8298	79	,92680	—	65,82	161,07	4,75	62,09	,6276
100 + 30	,88436	—	25,00	122,60	2,40	81,57	,8246	100 + 80	,92741	—	66,65	161,86	4,79	61,78	,6245
31	,88558	—	25,83	123,37	2,46	81,06	,8194	81	,92800	—	67,48	162,66	4,82	61,47	,6214
32	,88678	—	26,66	124,15	2,51	80,55	,8143	82	,92858	—	68,32	163,46	4,86	61,18	,6184
33	,88797	—	27,49	124,92	2,57	80,05	,8093	83	,92916	—	69,15	164,25	4,90	60,88	,6154
34	,88914	—	28,33	125,69	2,64	79,56	,8043	84	,92974	—	69,99	165,05	4,94	60,58	,6125
100 + 35	,89029	—	29,16	126,46	2,70	79,07	,7993	100 + 85	,93030	—	70,82	165,84	4,98	60,29	,6095
36	,89141	—	29,99	127,24	2,75	78,59	,7945	86	,93086	—	71,65	166,65	5,00	60,00	,6067
37	,89252	—	30,84	128,01	2,83	78,11	,7897	87	,93142	—	72,49	167,44	5,05	59,72	,6038
38	,89360	—	31,66	128,79	2,87	77,64	,7849	88	,93195	—	73,32	168,24	5,08	59,43	,6009
39	,89467	—	32,49	129,57	2,92	77,17	,7802	89	,93248	—	74,16	169,05	5,11	59,16	,5981
100 + 40	,89572	—	33,33	130,35	2,98	76,71	,7756	100 + 90	,93299	—	74,99	169,85	5,14	58,88	,5952
41	,89678	—	34,16	131,12	3,04	76,26	,7709	91	,93351	—	75,82	170,65	5,17	58,60	,5924
42	,89781	—	34,99	131,90	3,09	75,81	,7664	92	,93401	—	76,65	171,44	5,21	58,33	,5897
43	,89884	—	35,83	132,68	3,15	75,37	,7619	93	,93451	—	77,49	172,25	5,24	58,06	,5869
44	,89985	—	36,66	133,46	3,20	74,93	,7575	94	,93501	—	78,32	173,05	5,27	57,79	,5842
100 + 45	,90084	—	37,49	134,24	3,25	74,49	,7531	100 + 95	,93550	—	79,15	173,85	5,30	57,52	,5815
46	,90181	—	38,32	135,02	3,30	74,06	,7488	96	,93598	—	79,97	174,64	5,33	57,26	,5789
47	,90276	—	39,16	135,80	3,36	73,64	,7445	97	,93646	—	80,80	175,44	5,36	57,00	,5763
48	,90370	—	39,99	136,58	3,41	73,22	,7402	98	,93693	—	81,64	176,24	5,40	56,74	,5737
49	,90462	—	40,83	137,37	3,46	72,80	,7360	99	,93740	—	82,47	177,04	5,43	56,48	,5711

TABLE II. HEAT 41°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100+100	,93786	100	83,32	177,85	5,47	56,22	,5684	100 + 50	,96404	100	166,64	259,53	7,11	38,53	,3895
99	,93833	—	84,17	178,66	5,51	55,97	,5658	49	,96459	—	170,04	262,90	7,14	38,04	,3845
98	,93879	—	85,03	179,49	5,54	55,71	,5631	48	,96514	—	173,58	266,42	7,16	37,53	,3794
97	,93926	—	85,91	180,34	5,57	55,45	,5605	47	,96569	—	177,27	270,10	7,17	37,02	,3743
96	,93972	—	86,80	181,20	5,60	55,19	,5579	46	,96623	—	181,13	273,95	7,18	36,50	,3690
100 + 95	,94019	—	87,71	182,07	5,64	54,92	,5552	100 + 45	,96678	—	185,16	277,96	7,20	35,97	,3637
94	,94066	—	88,64	182,98	5,66	54,65	,5525	44	,96731	—	189,36	282,16	7,20	35,43	,3583
93	,94113	—	89,59	183,90	5,69	54,38	,5497	43	,96785	—	193,77	286,58	7,19	34,89	,3528
92	,94160	—	90,56	184,84	5,72	54,10	,5469	42	,96838	—	198,38	291,19	7,19	34,34	,3472
91	,94208	—	91,56	185,80	5,76	53,82	,5441	41	,96890	—	203,22	296,01	7,21	33,78	,3415
100 + 90	,94256	—	92,58	186,79	5,79	53,53	,5412	100 + 40	,96941	—	208,30	301,10	7,20	33,21	,3357
89	,94306	—	93,62	187,79	5,83	53,24	,5383	39	,96994	—	213,64	306,45	7,19	32,63	,3299
88	,94356	—	94,68	188,82	5,86	52,95	,5354	38	,97045	—	219,26	312,09	7,17	32,04	,3239
87	,94406	—	95,76	189,88	5,88	52,67	,5324	37	,97096	—	225,19	318,04	7,15	31,44	,3179
86	,94457	—	96,88	190,97	5,91	52,37	,5294	36	,97148	—	231,44	324,31	7,13	30,83	,3117
100 + 85	,94508	—	98,02	192,06	5,96	52,06	,5263	100 + 35	,97198	—	238,06	330,95	7,11	30,22	,3054
84	,94559	—	99,19	193,20	5,99	51,76	,5233	34	,97249	—	245,05	337,97	7,08	29,59	,2991
83	,94610	—	100,38	194,36	6,02	51,45	,5202	33	,97300	—	252,48	345,45	7,03	28,95	,2927
82	,94661	—	101,61	195,55	6,06	51,14	,5170	32	,97351	—	260,38	353,38	7,00	28,30	,2861
81	,94712	—	102,86	196,76	6,10	50,82	,5138	31	,97403	—	268,77	361,82	6,95	27,64	,2794
100 + 80	,94762	—	104,15	198,03	6,12	50,50	,5105	100 + 30	,97455	—	277,74	370,83	6,91	26,97	,2726
79	,94814	—	105,47	199,30	6,17	50,17	,5072	29	,97507	—	287,31	380,46	6,85	26,28	,2657
78	,94866	—	106,82	200,62	6,20	49,84	,5039	28	,97560	—	297,57	390,78	6,79	25,59	,2587
77	,94918	—	108,21	201,97	6,24	49,51	,5005	27	,97614	—	308,59	401,87	6,72	24,88	,2516
76	,94970	—	109,63	203,36	6,27	49,17	,4971	26	,97668	—	320,46	413,82	6,64	24,16	,2443
100 + 75	,95023	—	111,09	204,79	6,30	48,83	,4936	100 + 25	,97722	—	333,28	426,70	6,58	23,43	,2369
74	,95076	—	112,59	206,25	6,34	48,48	,4901	24	,97780	—	347,17	440,67	6,50	22,69	,2294
73	,95129	—	114,14	207,75	6,39	48,13	,4865	23	,97839	—	362,26	455,85	6,41	21,93	,2218
72	,95183	—	115,72	209,30	6,42	47,78	,4830	22	,97898	—	378,73	472,41	6,32	21,16	,2140
71	,95237	—	117,35	210,90	6,45	47,42	,4794	21	,97960	—	396,76	490,54	6,22	20,38	,2061
100 + 70	,95291	—	119,02	212,55	6,47	47,05	,4756	100 + 20	,98023	—	416,60	510,49	6,11	19,59	,1980
69	,95346	—	120,74	214,24	6,50	46,68	,4719	19	,98087	—	438,53	532,52	6,01	18,78	,1898
68	,95401	—	122,52	215,97	6,55	46,30	,4681	18	,98152	—	462,90	557,02	5,88	17,95	,1815
67	,95456	—	124,35	217,77	6,58	45,92	,4643	17	,98221	—	490,12	584,37	5,75	17,11	,1730
66	,95511	—	126,24	219,62	6,62	45,53	,4604	16	,98293	—	520,76	615,14	5,62	16,26	,1643
100 + 65	,95567	—	128,18	221,52	6,66	45,14	,4564	100 + 15	,98366	—	555,48	650,01	5,47	15,39	,1555
64	,95622	—	130,28	223,49	6,69	44,74	,4524	14	,98443	—	595,15	689,85	5,30	14,50	,1465
63	,95677	—	132,24	225,52	6,72	44,34	,4483	13	,98524	—	640,92	735,78	5,14	13,59	,1374
62	,95733	—	134,37	227,61	6,76	43,93	,4442	12	,98608	—	694,34	789,37	4,97	12,67	,1281
61	,95789	—	136,58	229,80	6,78	43,52	,4400	11	,98698	—	757,46	852,67	4,79	11,73	,1186
100 + 60	,95845	—	138,86	232,03	6,83	43,10	,4357	100 + 10	,98790	—	833,21	928,59	4,62	10,77	,1089
59	,95901	—	141,21	234,36	6,85	42,67	,4314	9	,98889	—	925,79	1021,40	4,39	9,79	,0990
58	,95957	—	143,65	236,75	6,90	42,24	,4270	8	,98993	—	1041,51	1137,34	4,17	8,79	,0889
57	,96014	—	146,17	239,25	6,92	41,80	,4226	7	,99103	—	1190,30	1286,34	3,96	7,77	,0786
56	,96070	—	148,79	241,83	6,96	41,35	,4181	6	,99221	—	1388,69	1484,95	3,74	6,73	,0681
100 + 55	,96125	—	151,48	244,50	6,98	40,90	,4135	100 + 5	,99344	—	1666,43	1762,94	3,49	5,67	,0573
54	,96182	—	154,27	247,27	7,00	40,43	,4088	4	,99475	—	2083,03	2179,81	3,22	4,59	,0464
53	,96238	—	157,17	250,17	7,00	39,97	,4041	3	,99615	—	2777,36	2874,40	2,96	3,48	,0352
52	,96293	—	160,20	253,17	7,03	39,50	,3993	2	,99765	—	4166,03	4263,33	2,70	2,35	,0237
51	,96348	—	163,36	256,28	7,08	39,02	,3944	1	,99924	—	8332,10	8429,66	2,44	1,19	,0120

TABLE I. HEAT 42°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83353	100	—	100,00	—	100,00	1,0104	100 + 50	,90510	100	41,64	138,14	3,50	72,39	,7314
1	,83582	—	0,83	100,72	0,11	99,28	1,0032	51	,90599	—	42,47	138,93	3,54	71,98	,7273
2	,83807	—	1,67	101,45	0,22	98,57	,9960	52	,90686	—	43,30	139,71	3,59	71,58	,7232
3	,84026	—	2,50	102,18	0,32	97,87	,9889	53	,90772	—	44,13	140,49	3,64	71,18	,7191
4	,84240	—	3,33	102,91	0,42	97,18	,9819	54	,90857	—	44,97	141,28	3,69	70,78	,7151
100 + 5	,84447	—	4,17	103,64	0,53	96,49	,9749	100 + 55	,90941	—	45,80	142,06	3,74	70,39	,7112
6	,84651	—	5,00	104,38	0,62	95,81	,9680	56	,91023	—	46,63	142,85	3,78	70,00	,7073
7	,84849	—	5,83	105,12	0,71	95,13	,9612	57	,91105	—	47,46	143,64	3,82	69,62	,7034
8	,85042	—	6,66	105,86	0,80	94,47	,9545	58	,91185	—	48,30	144,42	3,88	69,24	,6996
9	,85231	—	7,49	106,60	0,89	93,81	,9478	59	,91263	—	49,14	145,21	3,93	68,86	,6958
100 + 10	,85415	—	8,33	107,35	0,98	93,16	,9412	100 + 60	,91341	—	49,96	146,00	3,96	68,49	,6920
11	,85594	—	9,16	108,10	1,06	92,51	,9347	61	,91418	—	50,80	146,79	4,01	68,12	,6883
12	,85768	—	10,00	108,85	1,15	91,87	,9283	62	,91493	—	51,63	147,58	4,05	67,76	,6846
13	,85939	—	10,83	109,60	1,23	91,24	,9219	63	,91568	—	52,46	148,37	4,09	67,40	,6810
14	,86106	—	11,66	110,36	1,30	90,62	,9156	64	,91641	—	53,29	149,16	4,13	67,04	,6773
100 + 15	,86269	—	12,48	111,11	1,37	90,00	,9093	100 + 65	,91713	—	54,13	149,95	4,18	66,68	,6737
16	,86430	—	13,32	111,87	1,45	89,38	,9032	66	,91785	—	54,96	150,74	4,22	66,33	,6702
17	,86588	—	14,16	112,63	1,53	88,78	,8971	67	,91857	—	55,79	151,54	4,25	65,99	,6667
18	,86743	—	14,99	113,39	1,60	88,19	,8911	68	,91928	—	56,62	152,33	4,29	65,64	,6633
19	,86895	—	15,82	114,15	1,67	87,60	,8851	69	,91998	—	57,46	153,12	4,34	65,30	,6598
100 + 20	,87043	—	16,65	114,91	1,74	87,02	,8792	100 + 70	,92066	—	58,29	153,91	4,38	64,97	,6564
21	,87190	—	17,49	115,68	1,81	86,45	,8734	71	,92133	—	59,12	154,70	4,42	64,64	,6531
22	,87333	—	18,32	116,44	1,88	85,88	,8677	72	,92200	—	59,95	155,50	4,45	64,31	,6497
23	,87474	—	19,15	117,20	1,95	85,32	,8620	73	,92265	—	60,79	156,29	4,50	63,98	,6464
24	,87612	—	19,98	117,97	2,01	84,76	,8564	74	,92329	—	61,62	157,08	4,54	63,66	,6432
100 + 25	,87748	—	20,82	118,74	2,08	84,22	,8509	100 + 75	,92391	—	62,45	157,88	4,57	63,34	,6399
26	,87881	—	21,65	119,51	2,14	83,68	,8454	76	,92454	—	63,29	158,67	4,62	63,02	,6367
27	,88012	—	22,49	120,28	2,21	83,14	,8400	77	,92516	—	64,12	159,48	4,64	62,71	,6335
28	,88141	—	23,32	121,05	2,27	82,61	,8347	78	,92577	—	64,96	160,26	4,70	62,40	,6304
29	,88267	—	24,15	121,82	2,33	82,09	,8294	79	,92638	—	65,79	161,05	4,74	62,09	,6273
100 + 30	,88390	—	24,98	122,69	2,39	81,57	,8241	100 + 80	,92099	—	66,62	161,85	4,77	61,78	,6242
31	,88513	—	25,81	123,37	2,44	81,06	,8190	81	,92758	—	67,45	162,65	4,80	61,48	,6211
32	,88633	—	26,65	124,14	2,51	80,56	,8139	82	,92816	—	68,28	163,45	4,83	61,18	,6181
33	,88752	—	27,48	124,92	2,56	80,06	,8089	83	,92874	—	69,12	164,24	4,88	60,88	,6151
34	,88869	—	28,32	125,68	2,64	79,57	,8039	84	,92932	—	69,95	165,04	4,91	60,59	,6122
100 + 35	,88984	—	29,15	126,46	2,69	79,08	,7989	100 + 85	,92988	—	70,78	165,83	4,95	60,30	,6093
36	,89096	—	29,98	127,23	2,75	78,60	,7941	86	,93044	—	71,61	166,63	4,98	60,01	,6064
37	,89207	—	30,82	128,01	2,81	78,12	,7893	87	,93101	—	72,45	167,43	5,02	59,73	,6035
38	,89316	—	31,65	128,78	2,87	77,65	,7845	88	,93153	—	73,28	168,23	5,05	59,44	,6006
39	,89423	—	32,47	129,56	2,91	77,18	,7798	89	,93206	—	74,11	169,03	5,08	59,16	,5978
100 + 40	,89528	—	33,31	130,34	2,97	76,72	,7752	100 + 90	,93257	—	74,95	169,83	5,12	58,88	,5950
41	,89634	—	34,14	131,11	3,03	76,27	,7706	91	,93309	—	75,78	170,63	5,15	58,61	,5922
42	,89738	—	34,97	131,89	3,08	75,82	,7661	92	,93359	—	76,61	171,43	5,18	58,33	,5894
43	,89840	—	35,81	132,67	3,14	75,37	,7616	93	,93409	—	77,45	172,23	5,22	58,06	,5866
44	,89941	—	36,64	133,45	3,19	74,93	,7571	94	,93459	—	78,28	173,03	5,25	57,79	,5840
100 + 45	,90041	—	37,47	134,23	3,24	74,50	,7527	100 + 95	,93508	—	79,11	173,83	5,28	57,53	,5813
46	,90138	—	38,30	135,01	3,29	74,07	,7484	96	,93556	—	79,93	174,62	5,31	57,27	,5786
47	,90232	—	39,14	135,79	3,35	73,64	,7441	97	,93604	—	80,76	175,42	5,34	57,01	,5760
48	,90327	—	39,97	136,57	3,40	73,22	,7399	98	,93651	—	81,59	176,21	5,38	56,75	,5734
49	,90419	—	40,80	137,35	3,45	72,80	,7356	99	,93699	—	82,43	177,02	5,41	56,49	,5708

TABLE II. HEAT 42°.

I. Water and spirit by weight.	II. Specific gravity	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93744	100	83,28	177,83	5,45	56,23	,5681
99	,93792	—	84,13	178,64	5,49	55,97	,5655
98	,93838	—	84,99	179,47	5,52	55,72	,5629
97	,93885	—	85,86	180,32	5,54	55,45	,5603
96	,93932	—	86,75	181,18	5,57	55,19	,5576
100 + 95	,93980	—	87,66	182,05	5,61	54,92	,5549
94	,94026	—	88,59	182,95	5,64	54,66	,5522
93	,94074	—	89,54	183,88	5,66	54,39	,5495
92	,94120	—	90,51	184,82	5,69	54,11	,5467
91	,94168	—	91,51	185,78	5,73	53,82	,5439
100 + 90	,94216	—	92,53	186,77	5,76	53,54	,5410
89	,94266	—	93,57	187,76	5,81	53,25	,5381
88	,94316	—	94,63	188,80	5,83	52,96	,5352
87	,94366	—	95,71	189,86	5,85	52,67	,5322
86	,94417	—	96,83	190,94	5,89	52,37	,5292
100 + 85	,94468	—	97,97	192,04	5,93	52,07	,5261
84	,94519	—	99,13	193,17	5,96	51,77	,5231
83	,94570	—	100,33	194,33	6,00	51,46	,5199
82	,94621	—	101,56	195,52	6,04	51,14	,5168
81	,94672	—	102,81	196,74	6,07	50,83	,5136
100 + 80	,94722	—	104,09	198,00	6,09	50,51	,5103
79	,94775	—	105,41	199,28	6,13	50,18	,5070
78	,94827	—	106,76	200,59	6,17	49,85	,5037
77	,94879	—	108,15	201,94	6,21	49,52	,5003
76	,94932	—	109,57	203,33	6,24	49,18	,4969
100 + 75	,94985	—	111,03	204,76	6,27	48,84	,4934
74	,95038	—	112,53	206,22	6,31	48,49	,4899
73	,95091	—	114,08	207,72	6,36	48,14	,4863
72	,95145	—	115,66	209,27	6,39	47,78	,4828
71	,95200	—	117,28	210,87	6,41	47,42	,4792
100 + 70	,95254	—	118,96	212,51	6,45	47,05	,4754
69	,95309	—	120,67	214,20	6,47	46,68	,4717
68	,95364	—	122,45	215,94	6,51	46,30	,4679
67	,95419	—	124,28	217,73	6,55	45,92	,4641
66	,95475	—	126,17	219,58	6,59	45,54	,4602
100 + 65	,95531	—	128,11	221,48	6,63	45,15	,4562
64	,95586	—	130,21	223,45	6,66	44,75	,4522
63	,95641	—	132,17	225,48	6,69	44,35	,4481
62	,95698	—	134,30	227,57	6,73	43,94	,4440
61	,95754	—	136,51	229,75	6,76	43,52	,4398
100 + 60	,95810	—	138,78	231,99	6,79	43,11	,4355
59	,95866	—	141,14	234,31	6,83	42,68	,4312
58	,95923	—	143,57	236,70	6,87	42,24	,4268
57	,95981	—	146,09	239,20	6,89	41,80	,4224
56	,96036	—	148,71	241,78	6,93	41,36	,4179
100 + 55	,96092	—	151,40	244,45	6,95	40,90	,4133
54	,96149	—	154,19	247,22	6,97	40,44	,4087
53	,96205	—	157,08	250,11	6,97	39,98	,4040
52	,96261	—	160,11	253,11	7,00	39,51	,3992
51	,96317	—	163,27	256,22	7,05	39,03	,3943

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96373	100	166,55	259,47	7,08	38,54	,3894
49	,96428	—	169,95	262,84	7,11	38,05	,3844
48	,96484	—	173,48	266,36	7,12	37,54	,3793
47	,96539	—	177,17	270,03	7,14	37,03	,3742
46	,96594	—	181,03	273,88	7,15	36,51	,3689
100 + 45	,96650	—	185,06	277,89	7,17	35,98	,3636
44	,96703	—	189,26	282,08	7,18	35,44	,3582
43	,96757	—	193,65	286,50	7,16	34,90	,3527
42	,96811	—	198,27	291,11	7,16	34,35	,3471
41	,96864	—	203,11	295,93	7,18	33,79	,3414
100 + 40	,96915	—	208,18	301,01	7,17	33,22	,3356
39	,96969	—	213,52	306,36	7,16	32,64	,3298
38	,97021	—	219,14	311,99	7,15	32,05	,3238
37	,97072	—	225,07	317,94	7,13	31,45	,3178
36	,97125	—	231,31	324,21	7,10	30,84	,3116
100 + 35	,97170	—	237,93	330,84	7,09	30,23	,3054
34	,97228	—	244,92	337,86	7,06	29,60	,2991
33	,97280	—	252,34	345,34	7,00	28,96	,2926
32	,97332	—	260,24	353,26	6,98	28,31	,2860
31	,97384	—	268,62	361,69	6,93	27,65	,2793
100 + 30	,97438	—	277,59	370,69	6,90	26,98	,2725
29	,97490	—	287,15	380,32	6,83	26,29	,2656
28	,97543	—	297,41	390,64	6,77	25,60	,2586
27	,97598	—	308,42	401,72	6,70	24,89	,2515
26	,97653	—	320,29	413,66	6,63	24,17	,2442
100 + 25	,97708	—	333,10	426,53	6,57	23,44	,2369
24	,97766	—	346,98	440,48	6,50	22,70	,2294
23	,97826	—	362,06	455,66	6,40	21,94	,2218
22	,97886	—	378,52	472,20	6,32	21,17	,2140
21	,97948	—	396,54	490,32	6,22	20,39	,2061
100 + 20	,98013	—	416,37	510,26	6,11	19,60	,1980
19	,98077	—	438,29	532,28	6,01	18,79	,1898
18	,98143	—	462,65	556,76	5,89	17,96	,1815
17	,98212	—	489,85	584,09	5,76	17,12	,1730
16	,98285	—	520,48	614,84	5,64	16,26	,1643
100 + 15	,98359	—	555,18	649,69	5,49	15,39	,1555
14	,98436	—	594,83	689,51	5,32	14,50	,1465
13	,98518	—	640,56	735,42	5,14	13,59	,1374
12	,98603	—	693,96	788,97	4,99	12,67	,1281
11	,98693	—	757,05	852,24	4,81	11,73	,1186
100 + 10	,98786	—	832,76	928,11	4,65	10,77	,1089
9	,98885	—	925,29	1020,87	4,42	9,79	,0990
8	,98990	—	1040,95	1136,74	4,21	8,80	,0889
7	,99101	—	1189,66	1285,66	4,00	7,78	,0786
6	,99219	—	1387,94	1484,15	3,79	6,74	,0681
100 + 5	,99343	—	1665,53	1761,99	3,54	5,68	,0573
4	,99474	—	2081,90	2178,62	3,28	4,59	,0464
3	,99614	—	2775,86	2872,83	3,03	3,48	,0352
2	,99764	—	4163,75	4261,01	2,74	2,35	,0237
1	,99923	—	8326,59	8425,08	2,51	1,19	,0120

TABLE I. HEAT 43°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83307	100	—	100,00	—	100,00	1,0098	100 + 50	,90467	100	41,61	138,13	3,48	72,40	,7310
1	,83536	—	0,83	100,72	0,11	99,28	1,0026	51	,90556	—	42,45	138,91	3,54	71,99	,7270
2	,83761	—	1,67	101,45	0,22	98,57	,9955	52	,90643	—	43,28	139,70	3,58	71,58	,7229
3	,83980	—	2,50	102,17	0,33	97,87	,9884	53	,90729	—	44,10	140,48	3,62	71,18	,7188
4	,84194	—	3,33	102,90	0,43	97,18	,9814	54	,90814	—	44,94	141,27	3,67	70,79	,7148
100 + 5	,84401	—	4,17	103,64	0,53	96,49	,9744	100 + 55	,90898	—	45,78	142,05	3,73	70,40	,7108
6	,84605	—	5,00	104,38	0,62	95,81	,9675	56	,90980	—	46,60	142,84	3,76	70,01	,7069
7	,84803	—	5,83	105,12	0,71	95,13	,9607	57	,91062	—	47,44	143,63	3,81	69,62	,7030
8	,84996	—	6,66	105,86	0,80	94,47	,9540	58	,91141	—	48,27	144,41	3,86	69,24	,6993
9	,85185	—	7,49	106,60	0,89	93,81	,9473	59	,91220	—	49,11	145,20	3,91	68,87	,6955
100 + 10	,85369	—	8,32	107,35	0,97	93,16	,9407	100 + 60	,91297	—	49,93	145,99	3,94	68,50	,6917
11	,85548	—	9,16	108,10	1,06	92,51	,9342	61	,91375	—	50,77	146,78	3,99	68,13	,6880
12	,85722	—	9,99	108,85	1,14	91,87	,9278	62	,91450	—	51,60	147,57	4,03	67,76	,6843
13	,85893	—	10,82	109,60	1,22	91,24	,9214	63	,91525	—	52,43	148,36	4,07	67,40	,6807
14	,86060	—	11,65	110,35	1,30	90,62	,9151	64	,91598	—	53,26	149,15	4,11	67,04	,6770
100 + 15	,86223	—	12,48	111,11	1,37	90,00	,9088	100 + 65	,91670	—	54,10	149,94	4,16	66,69	,6734
16	,86384	—	13,32	111,87	1,45	89,39	,9027	66	,91742	—	54,93	150,73	4,20	66,34	,6699
17	,86542	—	14,15	112,63	1,52	88,79	,8966	67	,91814	—	55,76	151,52	4,24	65,99	,6664
18	,86697	—	14,98	113,39	1,59	88,19	,8906	68	,91885	—	56,59	152,32	4,27	65,65	,6630
19	,86850	—	15,81	114,15	1,66	87,60	,8847	69	,91955	—	57,43	153,10	4,33	65,31	,6595
100 + 20	,86997	—	16,65	114,91	1,74	87,02	,8787	100 + 70	,92023	—	58,26	153,89	4,37	64,98	,6561
21	,87145	—	17,48	115,67	1,81	86,45	,8729	71	,92090	—	59,09	154,68	4,41	64,65	,6527
22	,87288	—	18,31	116,43	1,88	85,88	,8672	72	,92157	—	59,92	155,48	4,44	64,32	,6494
23	,87429	—	19,14	117,20	1,94	85,32	,8616	73	,92222	—	60,75	156,27	4,48	63,99	,6461
24	,87567	—	19,97	117,97	2,00	84,77	,8559	74	,92286	—	61,59	157,07	4,52	63,67	,6429
100 + 25	,87703	—	20,80	118,73	2,07	84,22	,8504	100 + 75	,92348	—	62,42	157,86	4,56	63,35	,6397
26	,87836	—	21,64	119,50	2,14	83,68	,8450	76	,92412	—	63,25	158,65	4,60	63,03	,6364
27	,87967	—	22,47	120,27	2,20	83,15	,8396	77	,92474	—	64,08	159,46	4,62	62,71	,6332
28	,88096	—	23,30	121,05	2,25	82,62	,8343	78	,92535	—	64,92	160,24	4,68	62,40	,6301
29	,88222	—	24,14	121,81	2,33	82,09	,8290	79	,92596	—	65,75	161,04	4,71	62,10	,6270
100 + 30	,88345	—	24,97	122,59	2,38	81,58	,8237	100 + 80	,92656	—	66,58	161,83	4,75	61,79	,6239
31	,88468	—	25,80	123,36	2,44	81,07	,8186	81	,92715	—	67,41	162,63	4,78	61,49	,6208
32	,88588	—	26,63	124,14	2,49	80,56	,8135	82	,92774	—	68,24	163,43	4,81	61,19	,6178
33	,88707	—	27,46	124,91	2,55	80,06	,8085	83	,92831	—	69,08	164,22	4,86	60,89	,6148
34	,88824	—	28,30	125,68	2,62	79,57	,8035	84	,92890	—	69,91	165,02	4,89	60,60	,6119
100 + 35	,88939	—	29,13	126,45	2,68	79,08	,7985	100 + 85	,92945	—	70,74	165,81	4,93	60,31	,6090
36	,89052	—	29,96	127,23	2,73	78,60	,7937	86	,93001	—	71,57	166,62	4,95	60,02	,6061
37	,89163	—	30,80	128,00	2,80	78,12	,7889	87	,93059	—	72,41	167,41	5,00	59,74	,6032
38	,89271	—	31,63	128,78	2,85	77,65	,7841	88	,93110	—	73,24	168,21	5,03	59,45	,6003
39	,89379	—	32,46	129,56	2,90	77,18	,7794	89	,93164	—	74,07	169,01	5,06	59,17	,5975
100 + 40	,89484	—	33,30	130,34	2,96	76,72	,7748	100 + 90	,93215	—	74,91	169,81	5,10	58,89	,5947
41	,89590	—	34,13	131,11	3,02	76,27	,7702	91	,93267	—	75,74	170,61	5,13	58,62	,5919
42	,89694	—	34,95	131,89	3,06	75,82	,7657	92	,93317	—	76,57	171,41	5,16	58,34	,5891
43	,89796	—	35,79	132,66	3,13	75,38	,7612	93	,93367	—	77,41	172,21	5,20	58,07	,5864
44	,89897	—	36,62	133,44	3,18	74,94	,7567	94	,93417	—	78,23	173,01	5,22	57,80	,5837
100 + 45	,89997	—	37,45	134,22	3,23	74,50	,7523	100 + 95	,93466	—	79,06	173,81	5,25	57,54	,5810
46	,90095	—	38,28	135,00	3,28	74,07	,7480	96	,93514	—	79,88	174,60	5,28	57,28	,5784
47	,90189	—	39,12	135,78	3,34	73,65	,7437	97	,93562	—	80,71	175,40	5,31	57,01	,5758
48	,90284	—	39,95	136,56	3,39	73,23	,7395	98	,93610	—	81,55	176,19	5,36	56,75	,5732
49	,90376	—	40,78	137,34	3,44	72,81	,7353	99	,93657	—	82,38	177,00	5,38	56,50	,5705

TABLE II. HEAT 43°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100+100	,93703	100	83,23	177,81	5,42	56,24	,5679	100 + 50	,96342	100	166,46	259,41	7,05	38,55	,3893
99	,93751	—	84,09	178,62	5,47	55,98	,5653	49	,96398	—	169,86	262,78	7,08	38,06	,3843
98	,93798	—	84,94	179,45	5,49	55,72	,5626	48	,96454	—	173,39	266,30	7,09	37,55	,3792
97	,93845	—	85,81	180,29	5,52	55,46	,5600	47	,96509	—	177,08	269,97	7,11	37,04	,3741
96	,93892	—	86,70	181,15	5,55	55,20	,5574	46	,96565	—	180,93	273,81	7,12	36,52	,3688
100 + 95	,93940	—	87,61	182,02	5,59	54,93	,5547	100 + 45	,96621	—	184,96	277,82	7,14	35,99	,3635
94	,93987	—	88,54	182,93	5,61	54,66	,5520	44	,96675	—	189,16	282,01	7,15	35,45	,3581
93	,94034	—	89,49	183,85	5,64	54,39	,5493	43	,96729	—	193,56	286,42	7,14	34,91	,3526
92	,94080	—	90,46	184,79	5,67	54,11	,5465	42	,96784	—	198,16	291,03	7,13	34,36	,3470
91	,94128	—	91,46	185,75	5,71	53,83	,5437	41	,96838	—	203,00	295,85	7,15	33,80	,3413
100 + 90	,94176	—	92,48	186,74	5,74	53,55	,5407	100 + 40	,96890	—	208,07	300,92	7,15	33,23	,3356
89	,94226	—	93,52	187,73	5,78	53,26	,5379	39	,96944	—	213,40	306,27	7,13	32,65	,3297
88	,94276	—	94,58	188,77	5,81	52,97	,5350	38	,96997	—	219,02	311,90	7,12	32,06	,3238
87	,94326	—	95,66	189,83	5,83	52,68	,5320	37	,97049	—	224,95	317,84	7,11	31,46	,3177
86	,94377	—	96,77	190,92	5,85	52,38	,5290	36	,97102	—	231,19	324,11	7,08	30,85	,3116
100 + 85	,94428	—	97,91	192,01	5,90	52,08	,5259	100 + 35	,97154	—	237,80	330,73	7,07	30,24	,3053
84	,94479	—	99,08	193,15	5,93	51,78	,5228	34	,97207	—	244,79	337,75	7,04	29,61	,2990
83	,94530	—	100,27	194,31	5,96	51,47	,5197	33	,97260	—	252,20	345,22	6,98	28,97	,2925
82	,94581	—	101,50	195,50	6,00	51,15	,5166	32	,97313	—	260,10	353,14	6,96	28,32	,2860
81	,94632	—	102,75	196,71	6,04	50,83	,5134	31	,97366	—	268,48	361,56	6,92	27,66	,2793
100 + 80	,94683	—	104,03	197,97	6,06	50,51	,5101	100 + 30	,97420	—	277,44	370,55	6,89	26,98	,2725
79	,94736	—	105,35	199,25	6,10	50,19	,5068	29	,97473	—	286,99	380,18	6,81	26,30	,2656
78	,94788	—	106,70	200,56	6,14	49,86	,5035	28	,97527	—	297,25	390,49	6,76	25,61	,2586
77	,94841	—	108,09	201,91	6,18	49,52	,5001	27	,97582	—	308,26	401,57	6,69	24,90	,2515
76	,94894	—	109,51	203,30	6,21	49,18	,4967	26	,97638	—	320,12	413,50	6,62	24,18	,2442
100 + 75	,94947	—	110,97	204,72	6,25	48,84	,4932	100 + 25	,97694	—	332,92	426,35	6,57	23,45	,2368
74	,95000	—	112,47	206,19	6,28	48,50	,4897	24	,97753	—	346,79	440,30	6,49	22,71	,2293
73	,95054	—	114,02	207,68	6,34	48,15	,4861	23	,97813	—	361,86	455,47	6,39	21,95	,2217
72	,95108	—	115,59	209,24	6,35	47,79	,4826	22	,97874	—	378,32	472,00	6,32	21,18	,2139
71	,95163	—	117,22	210,83	6,39	47,43	,4790	21	,97937	—	396,33	490,11	6,22	20,40	,2060
100 + 70	,95217	—	118,89	212,48	6,41	47,06	,4752	100 + 20	,98002	—	416,15	510,03	6,12	19,61	,1980
69	,95272	—	120,61	214,17	6,44	46,69	,4715	19	,98067	—	438,05	532,04	6,01	18,80	,1898
68	,95327	—	122,38	215,90	6,48	46,31	,4677	18	,98134	—	462,40	556,50	5,90	17,97	,1814
67	,95383	—	124,21	217,69	6,52	45,93	,4639	17	,98204	—	489,59	583,82	5,77	17,13	,1729
66	,95439	—	126,10	219,54	6,56	45,55	,4600	16	,98277	—	520,20	614,55	5,65	16,27	,1643
100 + 65	,95495	—	128,04	221,44	6,60	45,16	,4560	100 + 15	,98352	—	554,88	649,38	5,50	15,40	,1555
64	,95550	—	130,14	223,41	6,63	44,76	,4520	14	,98430	—	594,51	689,17	5,34	14,51	,1465
63	,95606	—	132,10	225,44	6,66	44,36	,4479	13	,98512	—	640,20	735,06	5,14	13,60	,1374
62	,95663	—	134,23	227,53	6,70	43,95	,4438	12	,98598	—	693,59	788,57	5,02	12,68	,1280
61	,95719	—	136,44	229,71	6,73	43,53	,4396	11	,98688	—	756,64	851,81	4,83	11,74	,1185
100 + 60	,95775	—	138,71	231,95	6,76	43,11	,4353	100 + 10	,98782	—	832,31	927,03	4,68	10,78	,1089
59	,95831	—	141,06	234,27	6,79	42,68	,4310	9	,98882	—	924,79	1020,34	4,45	9,80	,0990
58	,95889	—	143,49	236,66	6,83	42,25	,4266	8	,98987	—	1040,39	1136,14	4,25	8,80	,0889
57	,95948	—	146,01	239,15	6,86	41,81	,4222	7	,99099	—	1189,02	1284,98	4,04	7,78	,0786
56	,96002	—	148,63	241,73	6,90	41,36	,4177	6	,99217	—	1387,19	1483,36	3,83	6,74	,0681
100 + 55	,96059	—	151,32	244,40	6,92	40,91	,4132	100 + 5	,99342	—	1664,63	1761,04	3,59	5,68	,0573
54	,96116	—	154,11	247,17	6,94	40,45	,4086	4	,99473	—	2080,77	2177,44	3,33	4,59	,0464
53	,96173	—	157,00	250,05	6,95	39,99	,4039	3	,99613	—	2773,36	2871,27	3,09	3,48	,0352
52	,96229	—	160,02	253,05	6,97	39,52	,3991	2	,99763	—	4161,48	4258,69	2,79	2,35	,0237
51	,96286	—	163,18	256,16	7,02	39,04	,3942	1	,99922	—	8323,10	8420,51	2,59	1,19	,0120

TABLE I. HEAT 44°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83261	100	—	100,00	—	100,00	1,0092	100 + 50	,90424	100	41,59	138,12	3,47	72,40	,7307
1	,83490	—	0,83	100,72	0,11	99,28	1,0020	51	,90513	—	42,42	138,90	3,52	71,99	,7266
2	,83715	—	1,66	101,44	0,22	98,57	,9949	52	,90600	—	43,25	139,69	3,56	71,59	,7225
3	,83934	—	2,50	102,17	0,33	97,87	,9878	53	,90686	—	44,08	140,47	3,61	71,19	,7184
4	,84148	—	3,33	102,90	0,43	97,18	,9808	54	,90771	—	44,92	141,26	3,66	70,79	,7145
100 + 5	,84355	—	4,17	103,64	0,53	96,49	,9738	100 + 55	,90855	—	45,75	142,04	3,71	70,40	,7105
6	,84559	—	4,99	104,37	0,62	95,81	,9670	56	,90937	—	46,58	142,83	3,75	70,01	,7066
7	,84757	—	5,82	105,11	0,71	95,14	,9602	57	,91019	—	47,41	143,62	3,79	69,63	,7027
8	,84950	—	6,66	105,85	0,81	94,47	,9535	58	,91098	—	48,24	144,40	3,84	69,25	,6990
9	,85139	—	7,49	106,60	0,89	93,81	,9468	59	,91176	—	49,08	145,19	3,89	68,87	,6952
100 + 10	,85323	—	8,32	107,34	0,98	93,16	,9402	100 + 60	,91254	—	49,90	145,98	3,92	68,50	,6913
11	,85502	—	9,15	108,09	1,06	92,52	,9337	61	,91331	—	50,74	146,77	3,97	68,13	,6877
12	,85676	—	9,99	108,84	1,15	91,88	,9273	62	,91407	—	51,57	147,56	4,01	67,77	,6840
13	,85847	—	10,82	109,59	1,23	91,25	,9209	63	,91482	—	52,40	148,35	4,05	67,41	,6803
14	,86014	—	11,65	110,35	1,30	90,62	,9146	64	,91555	—	53,23	149,14	4,09	67,05	,6766
100 + 15	,86177	—	12,47	111,11	1,36	90,00	,9083	100 + 65	,91627	—	54,07	149,93	4,14	66,70	,6731
16	,86338	—	13,31	111,86	1,45	89,39	,9022	66	,91699	—	54,90	150,72	4,18	66,35	,6696
17	,86496	—	14,14	112,62	1,52	88,79	,8961	67	,91771	—	55,73	151,51	4,22	66,00	,6661
18	,86651	—	14,97	113,38	1,59	88,20	,8901	68	,91842	—	56,56	152,30	4,26	65,66	,6627
19	,86804	—	15,80	114,14	1,66	87,61	,8842	69	,91912	—	57,40	153,09	4,31	65,32	,6592
100 + 20	,86952	—	16,64	114,91	1,73	87,03	,8783	100 + 70	,91980	—	58,23	153,88	4,35	64,98	,6558
21	,87100	—	17,47	115,67	1,80	86,45	,8725	71	,92047	—	59,06	154,67	4,39	64,65	,6524
22	,87243	—	18,30	116,43	1,87	85,88	,8668	72	,92114	—	59,89	155,47	4,42	64,32	,6491
23	,87384	—	19,13	117,19	1,94	85,32	,8612	73	,92179	—	60,72	156,26	4,46	63,99	,6458
24	,87522	—	19,96	117,96	2,00	84,77	,8556	74	,92243	—	61,55	157,05	4,50	63,67	,6426
100 + 25	,87658	—	20,79	118,73	2,06	84,23	,8500	100 + 75	,92305	—	62,39	157,85	4,54	63,35	,6394
26	,87791	—	21,63	119,50	2,13	83,69	,8445	76	,92370	—	63,22	158,64	4,58	63,03	,6361
27	,87922	—	22,46	120,27	2,19	83,15	,8392	77	,92432	—	64,05	159,44	4,61	62,72	,6330
28	,88051	—	23,29	121,04	2,25	82,62	,8339	78	,92493	—	64,88	160,23	4,65	62,41	,6299
29	,88177	—	24,13	121,81	2,32	82,09	,8286	79	,92553	—	65,71	161,02	4,69	62,10	,6268
100 + 30	,88300	—	24,96	122,58	2,38	81,58	,8233	100 + 80	,92613	—	66,55	161,82	4,73	61,80	,6237
31	,88423	—	25,78	123,36	2,42	81,07	,8182	81	,92673	—	67,37	162,61	4,76	61,49	,6206
32	,88543	—	26,61	124,13	2,48	80,56	,8131	82	,92731	—	68,20	163,41	4,79	61,19	,6176
33	,88662	—	27,44	124,90	2,54	80,07	,8081	83	,92788	—	69,05	164,21	4,84	60,89	,6146
34	,88779	—	28,29	125,67	2,62	79,58	,8031	84	,92846	—	69,87	165,01	4,86	60,60	,6116
100 + 35	,88894	—	29,12	126,45	2,67	79,09	,7981	100 + 85	,92902	—	70,70	165,79	4,91	60,31	,6087
36	,89007	—	29,95	127,22	2,73	78,61	,7933	86	,92958	—	71,53	166,60	4,93	60,02	,6058
37	,89118	—	30,78	127,99	2,79	78,13	,7885	87	,93017	—	72,37	167,40	4,97	59,74	,6029
38	,89227	—	31,61	128,77	2,84	77,66	,7837	88	,93067	—	73,20	168,19	5,01	59,46	,6001
39	,89335	—	32,44	129,55	2,89	77,19	,7790	89	,93121	—	74,03	168,99	5,04	59,18	,5973
100 + 40	,89440	—	33,28	130,33	2,95	76,73	,7744	100 + 90	,93173	—	74,87	169,79	5,08	58,90	,5944
41	,89546	—	34,11	131,10	3,01	76,28	,7698	91	,93225	—	75,70	170,59	5,11	58,62	,5916
42	,89650	—	34,94	131,88	3,06	75,83	,7653	92	,93175	—	76,53	171,39	5,14	58,35	,5888
43	,89752	—	35,77	132,65	3,12	75,38	,7608	93	,93325	—	77,37	172,19	5,18	58,08	,5861
44	,89853	—	36,60	133,43	3,17	74,94	,7563	94	,93375	—	78,19	172,99	5,20	57,81	,5834
100 + 45	,89953	—	37,43	134,21	3,22	74,51	,7519	100 + 95	,93424	—	79,02	173,79	5,23	57,54	,5807
46	,90051	—	38,26	134,99	3,27	74,08	,7476	96	,93472	—	79,84	174,58	5,26	57,28	,5781
47	,90145	—	39,10	135,77	3,33	73,65	,7433	97	,93520	—	80,67	175,38	5,29	57,02	,5755
48	,90240	—	39,93	136,55	3,38	73,23	,7391	98	,93568	—	81,50	176,17	5,33	56,76	,5729
49	,90333	—	40,76	137,33	3,43	72,81	,7349	99	,93615	—	82,34	176,98	5,36	56,50	,5703

TABLE II. HEAT 44°.

I. Water and Spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93662	100	83,18	177,79	5,39	56,24	,5676
99	,93710	—	84,04	178,60	5,44	55,99	,5650
98	,93757	—	84,89	179,43	5,40	55,73	,5624
97	,93804	—	85,76	180,27	5,49	55,47	,5598
96	,93852	—	86,65	181,13	5,52	55,21	,5571
100 + 95	,93900	—	87,56	182,00	5,56	54,94	,5545
94	,93947	—	88,49	182,90	5,59	54,67	,5518
93	,93994	—	89,44	183,82	5,62	54,40	,5491
92	,94041	—	90,41	184,77	5,64	54,12	,5462
91	,94088	—	91,41	185,73	5,68	53,84	,5434
100 + 90	,94136	—	92,43	186,72	5,71	53,55	,5405
89	,94186	—	93,47	187,71	5,76	53,26	,5377
88	,94236	—	94,53	188,75	5,78	52,97	,5348
87	,94286	—	95,61	189,80	5,81	52,68	,5318
86	,94337	—	96,72	190,89	5,83	52,39	,5288
100 + 85	,94388	—	97,86	191,98	5,88	52,09	,5257
84	,94439	—	99,03	193,12	5,91	51,79	,5226
83	,94490	—	100,22	194,28	5,94	51,48	,5195
82	,94540	—	101,45	195,47	5,98	51,16	,5164
81	,94593	—	102,69	196,68	6,01	50,84	,5132
100 + 80	,94644	—	103,97	197,94	6,03	50,52	,5099
79	,94697	—	105,29	199,22	6,07	50,19	,5066
78	,94750	—	106,64	200,53	6,11	49,86	,5033
77	,94803	—	108,03	201,88	6,15	49,53	,4999
76	,94855	—	109,45	203,27	6,18	49,19	,4965
100 + 75	,94909	—	110,91	204,69	6,22	48,85	,4930
74	,94963	—	112,41	206,16	6,25	48,50	,4895
73	,95017	—	113,96	207,65	6,31	48,15	,4859
72	,95071	—	115,53	209,20	6,33	47,80	,4824
71	,95126	—	117,16	210,80	6,36	47,44	,4788
100 + 70	,95180	—	118,83	212,44	6,39	47,07	,4751
69	,95236	—	120,55	214,13	6,42	46,70	,4713
68	,95291	—	122,32	215,86	6,46	46,32	,4675
67	,95347	—	124,14	217,65	6,49	45,94	,4637
66	,95403	—	126,03	219,50	6,53	45,56	,4598
100 + 65	,95459	—	127,97	221,40	6,57	45,17	,4558
64	,95515	—	130,07	223,37	6,60	44,77	,4519
63	,95571	—	132,03	225,40	6,63	44,37	,4478
62	,95628	—	134,16	227,49	6,67	43,96	,4436
61	,95684	—	136,37	229,67	6,70	43,54	,4394
100 + 60	,95740	—	138,64	231,90	6,74	43,12	,4352
59	,95797	—	140,99	234,22	6,77	42,69	,4309
58	,95855	—	143,41	236,61	6,80	42,26	,4265
57	,95915	—	145,93	239,10	6,83	41,82	,4220
56	,95969	—	148,55	241,68	6,87	41,37	,4176
100 + 55	,96026	—	151,24	244,35	6,89	40,92	,4130
54	,96084	—	154,03	247,11	6,92	40,46	,4085
53	,96141	—	156,91	249,99	6,92	40,00	,4038
52	,96197	—	159,94	252,99	6,95	39,53	,3990
51	,96255	—	163,09	256,10	6,99	39,05	,3941

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96311	100	166,37	259,35	7,02	38,56	,3891
49	,96368	—	169,77	262,72	7,05	38,06	,3842
48	,96424	—	173,30	266,24	7,06	37,56	,3791
47	,96480	—	176,99	269,91	7,08	37,05	,3740
46	,96536	—	180,83	273,74	7,09	36,53	,3687
100 + 45	,96592	—	184,86	277,75	7,11	35,00	,3634
44	,96647	—	189,06	281,94	7,12	35,46	,3580
43	,96702	—	193,46	286,34	7,12	34,92	,3525
42	,96757	—	198,06	290,95	7,11	34,37	,3469
41	,96812	—	202,89	295,77	7,12	33,81	,3412
100 + 40	,96865	—	207,96	300,83	7,13	33,24	,3355
39	,96919	—	213,29	306,18	7,11	32,66	,3296
38	,96973	—	218,90	311,81	7,09	32,07	,3237
37	,97026	—	224,83	317,74	7,09	31,47	,3177
36	,97079	—	231,07	324,01	7,06	30,86	,3115
100 + 35	,97132	—	237,67	330,62	7,05	30,25	,3052
34	,97186	—	244,66	337,64	7,02	29,62	,2989
33	,97240	—	252,07	345,10	6,97	28,98	,2925
32	,97294	—	259,96	353,02	6,94	28,33	,2859
31	,97348	—	268,34	361,43	6,91	27,67	,2792
100 + 30	,97402	—	277,29	370,41	6,88	27,00	,2724
29	,97456	—	286,84	380,04	6,80	26,31	,2655
28	,97511	—	297,09	390,34	6,75	25,62	,2586
27	,97567	—	308,09	401,42	6,67	24,91	,2515
26	,97623	—	319,95	413,34	6,61	24,19	,2442
100 + 25	,97680	—	332,74	426,18	6,56	23,46	,2368
24	,97740	—	346,60	440,12	6,48	22,72	,2293
23	,97800	—	361,67	455,28	6,39	21,96	,2217
22	,97862	—	378,12	471,80	6,32	21,19	,2139
21	,97926	—	396,12	489,90	6,22	20,41	,2060
100 + 20	,97991	—	415,93	509,80	6,13	19,62	,1980
19	,98057	—	437,82	531,80	6,02	18,81	,1897
18	,98125	—	462,15	556,24	5,91	17,98	,1814
17	,98196	—	489,33	583,55	5,78	17,14	,1729
16	,98269	—	519,92	614,26	5,66	16,28	,1643
100 + 15	,98345	—	554,58	649,07	5,51	15,41	,1555
14	,98424	—	594,19	688,83	5,36	14,52	,1465
13	,98506	—	639,85	734,70	5,15	13,61	,1374
12	,98593	—	693,22	788,18	5,04	12,69	,1280
11	,98683	—	756,23	851,38	4,85	11,74	,1185
100 + 10	,98778	—	831,86	927,16	4,70	10,78	,1088
9	,98879	—	924,29	1019,81	4,48	9,80	,0990
8	,98984	—	1039,83	1135,54	4,29	8,81	,0889
7	,99097	—	1188,38	1284,30	4,08	7,79	,0786
6	,99215	—	1386,44	1482,57	3,87	6,74	,0681
100 + 5	,99340	—	1663,73	1760,09	3,64	5,68	,0573
4	,99472	—	2079,65	2176,26	3,39	4,60	,0464
3	,99612	—	2772,87	2869,71	3,16	3,48	,0352
2	,99762	—	4159,23	4256,39	2,84	2,35	,0237
1	,99921	—	8318,63	8415,96	2,67	1,19	,0120

TABLE I. HEAT 45°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83214	100	—	100,00	—	100,00	1,0087	100 + 50	,90380	100	41,57	138,11	3,46	72,41	,7303
1	,83444	—	0,83	100,72	0,11	99,28	1,0014	51	,90469	—	42,40	138,89	3,51	72,00	,7262
2	,83669	—	1,66	101,44	0,22	98,58	,9943	52	,90557	—	43,23	139,68	3,55	71,59	,7221
3	,83888	—	2,49	102,17	0,32	97,88	,9872	53	,90643	—	44,06	140,46	3,60	71,19	,7181
4	,84102	—	3,32	102,90	0,42	97,18	,9802	54	,90728	—	44,89	141,25	3,64	70,80	,7141
100 + 5	,84310	—	4,16	103,63	0,53	96,49	,9733	100 + 55	,90812	—	45,73	142,03	3,70	70,41	,7102
6	,84513	—	4,99	104,37	0,62	95,81	,9664	56	,90894	—	46,56	142,82	3,74	70,02	,7063
7	,84711	—	5,82	105,11	0,71	95,14	,9596	57	,90975	—	47,39	143,61	3,78	69,63	,7024
8	,84904	—	6,65	105,85	0,80	94,47	,9529	58	,91054	—	48,22	144,39	3,83	69,25	,6986
9	,85093	—	7,48	106,59	0,89	93,81	,9463	59	,91132	—	49,05	145,18	3,87	68,88	,6948
100 + 10	,85277	—	8,31	107,34	0,97	93,16	,9397	100 + 60	,91211	—	49,88	145,97	3,91	68,51	,6910
11	,85456	—	9,14	108,09	1,05	92,52	,9332	61	,91287	—	50,72	146,76	3,96	68,14	,6873
12	,85630	—	9,98	108,84	1,14	91,88	,9268	62	,91363	—	51,55	147,55	4,00	67,77	,6836
13	,85801	—	10,81	109,59	1,22	91,25	,9204	63	,91438	—	52,38	148,34	4,04	67,41	,6799
14	,85968	—	11,64	110,35	1,29	90,63	,9141	64	,91511	—	53,21	149,13	4,08	67,05	,6763
100 + 15	,86131	—	12,47	111,10	1,37	90,01	,9078	100 + 65	,91584	—	54,04	149,92	4,12	66,70	,6728
16	,86292	—	13,30	111,86	1,44	89,39	,9017	66	,91656	—	54,87	150,71	4,16	66,35	,6693
17	,86450	—	14,13	112,62	1,51	88,79	,8956	67	,91728	—	55,70	151,50	4,20	66,00	,6658
18	,86605	—	14,96	113,38	1,58	88,20	,8896	68	,91799	—	56,53	152,29	4,24	65,66	,6623
19	,86758	—	15,79	114,14	1,65	87,61	,8837	69	,91869	—	57,37	153,08	4,29	65,33	,6589
100 + 20	,86905	—	16,63	114,90	1,73	87,03	,8778	100 + 70	,91937	—	58,20	153,87	4,33	64,99	,6555
21	,87054	—	17,46	115,66	1,80	86,46	,8721	71	,92004	—	59,03	154,66	4,37	64,66	,6521
22	,87198	—	18,29	116,42	1,87	85,89	,8664	72	,92071	—	59,86	155,46	4,40	64,33	,6488
23	,87339	—	19,12	117,19	1,93	85,33	,8607	73	,92136	—	60,69	156,25	4,44	64,00	,6455
24	,87477	—	19,95	117,96	1,99	84,78	,8551	74	,92200	—	61,52	157,04	4,48	63,68	,6423
100 + 25	,87613	—	20,78	118,72	2,06	84,23	,8496	100 + 75	,92264	—	62 36	157,83	4 53	63,36	,6391
26	,87746	—	21,62	119,49	2,13	83,69	,8441	76	,92327	—	63,19	158,63	4,56	63,04	,6359
27	,87877	—	22,45	120,26	2,19	83,15	,8387	77	,92389	—	64 02	159,42	4,60	62,73	,6327
28	,88005	—	23,28	121,03	2,25	82,62	,8334	78	,92450	—	64,85	160,22	4,63	62,42	,6296
29	,88131	—	24,11	121,80	2,31	82,10	,8281	79	,92510	—	65,68	161,01	4,67	62,11	,6265
100 + 30	,88255	—	24,94	122,57	2,37	81,58	,8229	100 + 80	,92570	—	66,51	161,81	4,70	61,80	,6234
31	,88377	—	25,77	123,35	2,42	81,07	,8177	81	,92629	—	67,34	162,60	4,74	61,50	,6203
32	,88498	—	26,60	124,12	2,48	80,57	,8126	82	,92688	—	68,17	163,40	4,77	61,20	,6173
33	,88617	—	27,43	124,89	2,54	80,07	,8076	83	,92745	—	69,01	164,19	4,82	60,90	,6143
34	,88734	—	28,27	125,66	2,61	79,58	,8026	84	,92803	—	69,84	164,99	4,85	60,61	,6113
100 + 35	,88849	—	29,10	126,44	2,66	79,09	,7977	100 + 85	,92859	—	70,67	165,78	4,89	60,32	,6084
36	,88962	—	29,93	127,21	2,72	78,61	,7929	86	,92915	—	71,50	166,58	4,92	60,03	,6055
37	,89073	—	30,76	127,99	2,77	78,13	,7881	87	,92970	—	72,33	167,38	4,95	59,75	,6026
38	,89182	—	31,59	128,76	2,83	77,66	,7833	88	,93024	—	73,16	168,17	4,99	59,46	,5998
39	,89290	—	32,42	129,54	2,88	77,19	,7786	89	,93078	—	73,99	168,97	5,02	59,18	,5970
100 + 40	,89396	—	33,26	130,32	2,94	76,73	,7740	100 + 90	,93131	—	74,83	169,77	5,06	58,90	,5941
41	,89502	—	34,09	131,09	3,00	76,28	,7694	91	,93182	—	75,66	170,57	5,09	58,63	,5913
42	,89606	—	34,92	131,87	3,05	75,83	,7649	92	,93233	—	76,49	171,37	5,12	58,35	,5886
43	,89708	—	35,75	132,65	3,10	75,39	,7604	93	,93283	—	77,32	172,17	5,15	58,08	,5859
44	,89809	—	36,58	133,42	3,16	74,95	,7560	94	,93333	—	78,15	172,97	5,18	57,81	,5832
100 + 45	,89909	—	37,41	134,20	3,21	74,51	,7516	100 + 95	,93382	—	78,98	173,77	5,21	57,55	,5805
46	,90007	—	38,24	134,98	3,26	74,08	,7472	96	,93430	—	79,80	174,56	5,24	57,29	,5778
47	,90102	—	39,08	135,76	3,32	73,66	,7429	97	,93478	—	80,63	175,35	5,28	57,03	,5752
48	,90196	—	39,91	136,54	3,37	73,24	,7387	98	,93526	—	81,46	176,15	5,31	56,77	,5726
49	,90289	—	40,74	137,32	3,42	72,82	,7345	99	,93574	—	82,30	176,96	5,34	56,51	,5700

TABLE II. HEAT 45°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100+100	,93621	100	83,14	177,76	5,38	56,25	,5674	100 + 50	,96280	100	166,28	259,29	6,99	38,57	,3890
99	,93669	—	83,99	178,58	5,41	56,00	,5648	49	,96337	—	169,68	262,66	7,02	38,07	,3840
98	,93717	—	84,85	179,41	5,44	55,74	,5622	48	,96394	—	173,21	266,18	7,03	37,57	,3789
97	,93764	—	85,72	180,25	5,47	55,48	,5596	47	,96450	—	176,90	269,85	7,05	37,06	,3738
96	,93812	—	86,61	181,11	5,50	55,22	,5569	46	,96507	—	180,74	273,68	7,06	36,54	,3686
100 + 95	,93860	—	87,52	181,98	5,54	54,95	,5543	100 + 45	,96563	—	184,76	277,68	7,08	36,01	,3633
94	,93907	—	88,45	182,88	5,57	54,68	,5515	44	,96619	—	188,96	281,87	7,09	35,47	,3579
93	,93954	—	89,40	183,80	5,60	54,41	,5488	43	,96674	—	193,36	286,26	7,10	34,93	,3524
92	,94001	—	90,37	184,75	5,62	54,13	,5460	42	,96730	—	197,96	290,87	7,09	34,38	,3468
91	,94048	—	91,36	185,71	5,65	53,85	,5432	41	,96785	—	202,78	295,69	7,09	33,82	,3411
100 + 90	,94096	—	92,38	186,69	5,69	53,56	,5403	100 + 40	,96840	—	207,85	300,75	7,10	33,25	,3354
89	,94145	—	93,42	187,69	5,73	53,27	,5374	39	,96894	—	213,18	306,09	7,09	32,67	,3295
88	,94196	—	94,48	188,72	5,76	52,98	,5345	38	,96948	—	218,79	311,71	7,08	32,08	,3236
87	,94246	—	95,56	189,78	5,78	52,69	,5315	37	,97002	—	224,71	317,64	7,07	31,48	,3176
86	,94297	—	96,67	190,86	5,81	52,39	,5285	36	,97056	—	230,95	323,91	7,04	30,87	,3114
100 + 85	,94348	—	97,81	191,96	5,85	52,09	,5254	100 + 35	,97110	—	237,55	330,52	7,03	30,26	,3052
84	,94399	—	98,98	193,09	5,89	51,79	,5223	34	,97164	—	244,53	337,53	7,00	29,63	,2988
83	,94450	—	100,17	194,25	5,92	51,48	,5192	33	,97219	—	251,94	344,98	6,96	28,99	,2924
82	,94501	—	101,39	195,44	5,95	51,17	,5161	32	,97274	—	259,82	352,90	6,92	28,34	,2859
81	,94553	—	102,64	196,66	5,98	50,85	,5129	31	,97329	—	268,20	361,31	6,89	27,68	,2792
100 + 80	,94605	—	103,92	197,91	6,01	50,53	,5097	100 + 30	,97384	—	277,14	370,28	6,86	27,01	,2724
79	,94658	—	105,24	199,19	6,05	50,20	,5064	29	,97439	—	286,69	379,90	6,79	26,32	,2655
78	,94711	—	106,59	200,50	6,09	49,87	,5031	28	,97494	—	296,93	390,20	6,73	25,63	,2585
77	,94764	—	107,98	201,85	6,13	49,54	,4997	27	,97551	—	307,93	401,27	6,66	24,92	,2514
76	,94817	—	109,40	203,24	6,16	49,20	,4963	26	,97608	—	319,78	413,19	6,59	24,20	,2441
100 + 75	,94871	—	110,86	204,66	6,20	48,86	,4928	100 + 25	,97666	—	332,57	426,01	6,56	23,47	,2368
74	,94925	—	112,35	206,12	6,23	48,51	,4893	24	,97726	—	346,42	439,94	6,48	22,73	,2293
73	,94979	—	113,89	207,62	6,27	48,16	,4858	23	,97787	—	361,48	455,09	6,39	21,97	,2217
72	,95033	—	115,47	209,17	6,30	47,81	,4822	22	,97850	—	377,92	471,60	6,32	21,20	,2139
71	,95088	—	117,10	210,77	6,33	47,45	,4786	21	,97914	—	395,91	489,69	6,22	20,42	,2060
100 + 70	,95143	—	118,77	212,41	6,36	47,08	,4749	100 + 20	,97980	—	415,71	509,58	6,13	19,62	,1979
69	,95199	—	120,49	214,09	6,40	46,71	,4711	19	,98047	—	437,59	531,56	6,03	18,81	,1897
68	,95254	—	122,26	215,82	6,44	46,33	,4673	18	,98116	—	461,90	555,99	5,91	17,98	,1814
67	,95310	—	124,08	217,61	6,47	45,95	,4635	17	,98187	—	489,07	583,28	5,79	17,14	,1729
66	,95367	—	125,96	219,46	6,50	45,56	,4596	16	,98261	—	519,63	613,97	5,66	16,29	,1643
100 + 65	,95423	—	127,90	221,36	6,54	45,17	,4557	100 + 15	,98338	—	554,28	648,76	5,52	15,41	,1555
64	,95479	—	129,90	223,32	6,58	44,78	,4517	14	,98417	—	593,87	688,50	5,37	14,52	,1465
63	,95535	—	131,96	225,35	6,61	44,38	,4476	13	,98500	—	639,55	734,34	5,21	13,61	,1374
62	,95592	—	134,09	227,45	6,64	43,97	,4434	12	,98587	—	692,85	787,79	5,06	12,69	,1280
61	,95649	—	136,30	229,62	6,68	43,55	,4392	11	,98678	—	755,83	850,95	4,88	11,75	,1185
100 + 60	,95705	—	138,57	231,85	6,72	43,13	,4350	100 + 10	,98774	—	831,42	926,69	4,73	10,79	,1088
59	,95762	—	140,91	234,17	6,74	42,70	,4307	9	,98875	—	923,80	1019,29	4,51	9,81	,0990
58	,95820	—	143,34	236,57	6,77	42,27	,4263	8	,98981	—	1039,27	1134,95	4,32	8,81	,0889
57	,95878	—	145,86	239,05	6,81	41,83	,4219	7	,99094	—	1187,74	1283,62	4,12	7,79	,0786
56	,95935	—	148,47	241,63	6,84	41,38	,4174	6	,99213	—	1385,70	1481,78	3,92	6,75	,0681
100 + 55	,95993	—	151,16	244,30	6,86	40,93	,4129	100 + 5	,99338	—	1662,83	1759,14	3,69	5,69	,0573
54	,96051	—	153,93	247,06	6,87	40,47	,4083	4	,99470	—	2078,54	2175,09	3,45	4,60	,0464
53	,96108	—	156,83	249,93	6,90	40,01	,4036	3	,99611	—	2771,39	2868,16	3,23	3,49	,0352
52	,96165	—	159,86	252,93	6,93	39,54	,3988	2	,99761	—	4156,99	4254,09	2,90	2,35	,0237
51	,96223	—	163,01	256,05	6,96	39,06	,3939	1	,99919	—	8314,17	8411,41	2,76	1,19	,0120

TABLE I. HEAT 46°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W							
100 + 0	,83167	100	—	100,00	—	100.00	1,0081	100 + 50	,90336	100	41,55	138,09	3,46	72,41	,7300
1	,83397	—	0,83	100,72	0,11	99,28	1,0009	51	,90426	—	42,38	138,87	3,51	72,01	,7259
2	,83622	—	1,66	101,44	0,22	98,58	,9938	52	,90514	—	43,20	139,66	3,54	71,60	,7218
3	,83842	—	2,49	102,17	0,32	97,88	,9867	53	,90600	—	44,03	140,44	3,59	71,20	,7178
4	,84056	—	3,32	102,90	0,42	97,18	,9797	54	,90685	—	44,87	141,23	3,64	70,81	,7138
100 + 5	,84263	—	4,16	103,63	0,53	96,49	,9727	100 + 55	,90768	—	45,70	142,01	3,69	70,42	,7098
6	,84467	—	4,99	104,37	0,62	95,81	,9659	56	,90851	—	46,53	142,80	3,73	70,03	,7059
7	,84665	—	5,82	105,11	0,71	95,14	,9591	57	,90932	—	47,36	143,59	3,77	69,64	,7021
8	,84858	—	6,65	105,85	0,80	94,47	,9524	58	,91011	—	48,19	144,37	3,82	69,26	,6983
9	,85046	—	7,48	106,59	0,89	93,81	,9458	59	,91089	—	49,02	145,16	3,86	68,89	,6945
100 + 10	,85230	—	8,31	107,34	0,97	93,16	,9392	100 + 60	,91169	—	49,85	145,95	3,90	68,51	,6907
11	,85410	—	9,14	108,09	1,05	92,52	,9327	61	,91244	—	50,69	146,74	3,95	68,14	,6870
12	,85584	—	9,97	108,84	1,13	91,88	,9263	62	,91320	—	51,52	147,53	3,99	67,78	,6833
13	,85755	—	10,81	109,59	1,22	91,25	,9199	63	,91395	—	52,35	148,32	4,03	67,42	,6796
14	,85922	—	11,63	110,35	1,28	90,63	,9136	64	,91468	—	53,18	149,11	4,07	67,06	,6760
100 + 15	,86085	—	12,46	111,10	1,36	90,01	,9074	100 + 65	,91542	—	54,01	149,90	4,11	66,71	,6725
16	,86247	—	13,30	111,86	1,44	89,40	,9013	66	,91614	—	54,84	150,69	4,15	66,36	,6690
17	,86404	—	14,12	112,62	1,50	88,79	,8952	67	,91686	—	55,67	151,48	4,19	66,01	,6655
18	,86559	—	14,95	113,38	1,57	88,20	,8892	68	,91757	—	56,50	152,27	4,23	65,67	,6620
19	,86712	—	15,78	114,14	1,64	87,61	,8833	69	,91826	—	57,33	153,06	4,27	65,33	,6586
100 + 20	,86859	—	16,62	114,90	1,72	87,03	,8774	100 + 70	,91895	—	58,16	153,85	4,31	65,00	,6552
21	,87008	—	17,45	115,66	1,79	86,40	,8716	71	,91962	—	59,00	154,64	4,36	64,67	,6519
22	,87152	—	18,28	116,42	1,86	85,89	,8660	72	,92028	—	59,82	155,44	4,38	64,34	,6486
23	,87293	—	19,11	117,18	1,93	85,33	,8603	73	,92094	—	60,65	156,23	4,42	64,01	,6453
24	,87431	—	19,94	117,95	1,99	84,78	,8547	74	,92158	—	61,48	157,02	4,46	63,69	,6262
100 + 25	,87568	—	20,77	118,72	2,05	84,23	,8491	100 + 75	,92221	—	62,32	157,81	4,51	63,37	,6388
26	,87700	—	21,61	119,48	2,13	83,69	,8437	76	,92285	—	63,15	158,61	4,54	63,05	,6356
27	,87832	—	22,44	120,26	2,18	83,16	,8383	77	,92347	—	63,98	159,40	4,58	62,73	,6324
28	,87960	—	23,27	121,03	2,24	82,63	,8330	78	,92408	—	64,81	160,20	4,61	62,42	,6293
29	,88086	—	24,10	121,80	2,30	82,10	,8277	79	,92468	—	65,64	160,99	4,65	62,11	,6262
100 + 30	,88210	—	24,93	122,57	2,36	81,59	,8225	100 + 80	,92527	—	66,47	161,79	4,68	61,81	,6231
31	,88332	—	25,76	123,34	2,42	81,08	,8173	81	,92587	—	67,30	162,58	4,72	61,50	,6200
32	,88454	—	26,59	124,11	2,48	80,57	,8122	82	,92646	—	68,13	163,38	4,75	61,20	,6170
33	,88573	—	27,42	124,88	2,54	80,07	,8072	83	,92703	—	68,97	164,17	4,80	60,91	,6140
34	,88690	—	28,25	125,65	2,60	79,58	,8022	84	,92761	—	69,80	164,98	4,82	60,61	,6111
100 + 35	,88804	—	29,09	126,43	2,66	79,10	,7973	100 + 85	,92816	—	70,63	165,76	4,87	60,32	,6081
36	,88917	—	29,91	127,20	2,71	78,62	,7925	86	,92873	—	71,46	166,57	4,89	60,03	,6053
37	,89029	—	30,74	127,98	2,76	78,14	,7877	87	,92928	—	72,29	167,36	4,93	59,75	,6024
38	,89138	—	31,57	128,75	2,82	77,67	,7829	88	,92982	—	73,12	168,16	4,98	59,47	,5996
39	,89246	—	32,40	129,53	2,87	77,20	,7782	89	,93036	—	73,95	168,95	5,00	59,19	,5967
100 + 40	,89351	—	33,24	130,31	2,93	76,74	,7736	100 + 90	,93089	—	74,79	169,75	5,04	58,91	,5939
41	,89458	—	34,07	131,08	2,99	76,29	,7691	91	,93140	—	75,62	170,55	5,07	58,64	,5910
42	,89562	—	34,90	131,86	3,04	75,84	,7646	92	,93192	—	76,45	171,34	5,11	58,36	,5883
43	,89664	—	35,73	132,64	3,09	75,39	,7601	93	,93242	—	77,28	172,15	5,13	58,09	,5856
44	,89765	—	36,56	133,41	3,15	74,95	,7557	94	,93292	—	78,10	172,95	5,15	57,82	,5830
100 + 45	,89864	—	37,39	134,19	3,20	74,52	,7512	100 + 95	,93341	—	78,93	173,74	5,19	57,56	,5802
46	,89962	—	38,22	134,97	3,25	74,09	,7469	96	,93389	—	79,75	174,53	5,22	57,30	,5776
47	,90058	—	39,05	135,75	3,30	73,66	,7426	97	,93437	—	80,59	175,33	5,26	57,04	,5750
48	,90152	—	39,88	136,53	3,35	73,24	,7384	98	,93485	—	81,41	176,13	5,28	56,78	,5724
49	,90245	—	40,72	137,31	3,41	72,82	,7342	99	,93533	—	82,25	176,93	5,32	56,52	,5698

TABLE II. HEAT 46°.

I. Water and spirit by weight.	II. Specific gravity.	III Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93580	100	83,09	177,74	5,35	56,26	,5672	100 + 50	,96250	100	166,19	259,22	6,97	38,57	,3889
99	,93629	—	83,94	178,55	5,39	56,00	,5646	49	,96307	—	169,59	202,60	6,99	38,08	,3839
98	,93676	—	84,80	179,38	5,42	55,74	,5619	48	,96364	—	173,11	266,11	7,00	37,58	,3788
97	,93724	—	85,67	180,22	5,45	55,48	,5593	47	,96421	—	176,80	269,78	7,02	37,07	,3737
96	,93772	—	86,56	181,08	5,48	55,22	,5567	46	,96478	—	180,64	273,61	7,03	36,55	,3685
100 + 95	,93820	—	87,47	181,95	5,52	54,95	,5540	100 + 45	,96535	—	184,66	277,60	7,06	36,02	,3632
94	,93867	—	88,40	182,85	5,55	54,69	,5513	44	,96591	—	188,86	281,79	7,07	35,48	,3578
93	,93914	—	89,35	183,77	5,58	54,41	,5486	43	,96647	—	193,25	286,18	7,07	34,94	,3523
92	,93961	—	90,32	184,72	5,60	54,14	,5458	42	,96703	—	197,85	290,78	7,07	34,39	,3467
91	,94008	—	91,31	185,68	5,63	53,86	,5430	41	,96759	—	202,67	295,60	7,07	33,83	,3410
100 + 90	,94057	—	92,33	186,67	5,66	53,57	,5400	100 + 40	,96814	—	207,74	300,66	7,08	33,26	,3353
89	,94106	—	93,37	187,66	5,71	53,28	,5372	39	,96869	—	213,06	305,99	7,07	32,68	,3295
88	,94156	—	94,43	188,70	5,73	52,99	,5343	38	,96923	—	218,67	311,61	7,06	32,09	,3235
87	,94207	—	95,51	189,75	5,76	52,70	,5313	37	,96978	—	224,59	317,53	7,06	31,49	,3175
86	,94258	—	96,62	190,84	5,78	52,40	,5283	36	,97033	—	230,82	323,80	7,02	30,88	,3113
100 + 85	,94309	—	97,75	191,93	5,82	52,10	,5252	100 + 35	,97087	—	237,42	330,41	7,01	30,27	,3051
84	,94360	—	98,92	193,07	5,85	51,80	,5221	34	,97142	—	244,40	337,42	6,98	29,64	,2988
83	,94411	—	100,12	194,22	5,90	51,49	,5190	33	,97198	—	251,80	344,86	6,94	29,00	,2924
82	,94462	—	101,33	195,41	5,92	51,17	,5159	32	,97253	—	259,68	352,77	6,91	28,35	,2858
81	,94514	—	102,58	196,63	5,95	50,86	,5127	31	,97309	—	268,05	361,18	6,87	27,69	,2792
100 + 80	,94565	—	103,86	197,88	5,98	50,54	,5094	100 + 30	,97364	—	276,99	370,14	6,85	27,02	,2724
79	,94620	—	105,18	199,16	6,02	50,21	,5062	29	,97420	—	286,53	379,76	6,77	26,33	,2655
78	,94673	—	106,53	200,47	6,06	49,88	,5029	28	,97476	—	296,77	390,05	6,72	25,64	,2585
77	,94727	—	107,92	201,81	6,11	49,54	,4995	27	,97534	—	307,76	401,11	6,65	24,93	,2514
76	,94780	—	109,34	203,21	6,13	49,21	,4961	26	,97692	—	319,60	413,02	6,58	24,21	,2441
100 + 75	,94834	—	110,80	204,62	6,18	48,87	,4926	100 + 25	,97650	—	332,39	425,83	6,56	23,48	,2367
74	,94888	—	112,29	206,08	6,21	48,52	,4892	24	,97712	—	346,23	439,75	6,48	22,74	,2293
73	,94942	—	113,82	207,58	6,24	48,17	,4857	23	,97773	—	361,28	454,89	6,39	21,98	,2217
72	,94996	—	115,40	209,13	6,27	47,81	,4821	22	,97837	—	377,71	471,39	6,32	21,21	,2139
71	,95051	—	117,03	210,73	6,30	47,46	,4784	21	,97902	—	395,70	489,47	6,23	20,43	,2060
100 + 70	,95106	—	118,70	212,37	6,33	47,09	,4747	100 + 20	,97968	—	415,48	509,35	6,13	19,63	,1979
69	,95162	—	120,42	214,05	6,37	46,72	,4710	19	,98036	—	437,35	531,32	6,03	18,82	,1897
68	,95218	—	122,19	215,78	6,41	46,34	,4672	18	,98106	—	461,65	555,73	5,92	17,99	,1814
67	,95274	—	124,01	217,57	6,44	45,96	,4634	17	,98177	—	488,81	583,00	5,81	17,15	,1729
66	,95331	—	125,89	219,42	6,47	45,57	,4595	16	,98252	—	519,35	613,68	5,67	16,29	,1643
100 + 65	,95387	—	127,83	221,31	6,53	45,18	,4555	100 + 15	,98329	—	553,98	648,44	5,54	15,42	,1555
64	,95444	—	129,83	223,28	6,55	44,79	,4515	14	,98409	—	593,55	688,16	5,39	14,53	,1465
63	,95500	—	131,89	225,31	6,58	44,38	,4475	13	,98493	—	639,21	733,97	5,24	13,62	,1374
62	,95557	—	134,02	227,41	6,61	43,98	,4433	12	,98580	—	692,48	787,39	5,09	12,70	,1280
61	,95615	—	136,22	229,58	6,64	43,56	,4391	11	,98672	—	755,42	850,52	4,92	11,75	,1185
100 + 60	,95671	—	138,49	231,81	6,68	43,14	,4349	100 + 10	,98768	—	830,97	926,21	4,76	10,79	,1088
59	,95728	—	140,83	234,12	6,71	42,71	,4306	9	,98870	—	923,30	1018,76	4,54	9,81	,0990
58	,95787	—	143,26	236,52	6,74	42,28	,4262	8	,98976	—	1038,71	1134,36	4,35	8,81	,0889
57	,95845	—	145,78	239,00	6,78	41,84	,4218	7	,99090	—	1187,10	1282,95	4,15	7,79	,0786
56	,95902	—	148,39	241,58	6,81	41,39	,4173	6	,99210	—	1384,96	1481,00	3,90	6,75	,0681
100 + 55	,95959	—	151,08	244,25	6,83	40,94	,4127	100 + 5	,99334	—	1661,94	1758,21	3,73	5,69	,0573
54	,96019	—	153,85	247,01	6,84	40,48	,4082	4	,99467	—	2077,42	2173,93	3,49	4,60	,0464
53	,96078	—	156,74	249,87	6,87	40,02	,4035	3	,99608	—	2769,91	2866,63	3,28	3,49	,0352
52	,96134	—	159,77	252,87	6,90	39,55	,3987	2	,99758	—	4154,78	4251,80	2,98	2,35	,0237
51	,96192	—	162,92	255,99	6,93	39,06	,3938	1	,99916	—	8309,71	8406,88	2,83	1,19	,0120

TABLE I. HEAT 47°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of Bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83120	100	—	100,00	—	100,00	1,0075	100 + 50	,90292	100	41,52	138,08	3,44	72,42	,7296
1	,83350	—	0,83	100,72	0,11	99,28	1,0004	51	,90382	—	42,35	138,86	3,49	72,01	,7255
2	,83575	—	1,66	101,44	0,22	98,58	,9933	52	,90470	—	43,18	139,65	3,53	71,61	,7214
3	,83795	—	2,49	102,17	0,32	97,88	,9862	53	,90557	—	44,01	140,43	3,58	71,21	,7174
4	,84009	—	3,32	102,90	0,42	97,18	,9792	54	,90642	—	44,84	141,22	3,62	70,81	,7135
100 + 5	,84216	—	4,16	103,63	0,53	96,49	,9722	100 + 55	,90725	—	45,68	142,00	3,68	70,42	,7095
6	,84420	—	4,98	104,37	0,61	95,81	,9654	56	,90808	—	46,51	142,79	3,72	70,03	,7056
7	,84618	—	5,81	105,11	0,70	95,14	,9586	57	,90889	—	47,33	143,58	3,75	69,64	,7018
8	,84811	—	6,64	105,85	0,80	94,47	,9519	58	,90969	—	48,17	144,36	3,81	69,27	,6980
9	,84999	—	7,47	106,59	0,88	93,81	,9453	59	,91047	—	49,00	145,15	3,85	68,89	,6942
100 + 10	,85183	—	8,30	107,34	0,96	93,16	,9387	100 + 60	,91126	—	49,82	145,94	3,88	68,52	,6903
11	,85363	—	9,13	108,09	1,04	92,52	,9322	61	,91202	—	50,66	146,73	3,93	68,15	,6867
12	,85538	—	9,97	108,84	1,13	91,88	,9258	62	,91277	—	51,49	147,51	3,98	67,79	,6830
13	,85709	—	10,80	109,59	1,21	91,25	,9194	63	,91353	—	52,32	148,31	4,01	67,43	,6793
14	,85876	—	11,63	110,34	1,27	90,63	,9131	64	,91426	—	53,15	149,10	4,05	67,07	,6757
100 + 15	,86039	—	12,46	111,09	1,37	90,01	,9069	100 + 65	,91499	—	53,98	149,89	4,09	66,72	,6721
16	,86201	—	13,29	111,85	1,44	89,40	,9008	66	,91571	—	54,81	150,68	4,13	66,37	,6687
17	,86358	—	14,11	112,61	1,50	88,80	,8947	67	,91643	—	55,64	151,47	4,17	66,02	,6652
18	,86513	—	14,94	113,37	1,57	88,21	,8887	68	,91714	—	56,47	152,25	4,22	65,67	,6617
19	,86660	—	15,77	114,13	1,64	87,62	,8828	69	,91783	—	57,30	153,05	4,25	65,34	,6583
100 + 20	,86813	—	16,61	114,89	1,72	87,04	,8769	100 + 70	,91852	—	58,13	153,84	4,29	65,00	,6549
21	,86962	—	17,44	115,65	1,79	86,46	,8712	71	,91919	—	58,96	154,63	4,33	64,67	,6516
22	,87106	—	18,27	116,41	1,86	85,89	,8655	72	,91985	—	59 79	155,43	4,36	64,34	,6483
23	,87247	—	19,10	117,18	1,92	85,33	,8598	73	,92051	—	60,62	156,22	4,40	64,01	,6450
24	,87385	—	19,93	117,95	1,98	84,79	,8542	74	,92115	—	61,45	157,01	4,44	63,69	,6417
100 + 25	,87522	—	20,76	118,71	2,05	84,24	,8487	100 + 75	,92178	—	62,29	157,80	4,49	63,37	,6385
26	,87655	—	21,60	119,48	2,12	83,70	,8432	76	,92242	—	63,12	158,59	4,53	63,05	,6353
27	,87787	—	22,43	120,25	2,18	83,16	,8378	77	,92304	—	63,95	159,39	4,56	62,74	,6321
28	,87915	—	23,26	121,02	2,24	82,63	,8325	78	,92366	—	64,78	160,18	4,60	62,43	,6290
29	,88041	—	24,09	121,79	2,30	82,11	,8273	79	,92425	—	65,61	160,97	4,64	62,12	,6259
100 + 30	,88165	—	24,92	122,56	2,36	81,59	,8221	100 + 80	,92484	—	66,44	161,77	4,67	61,82	,6228
31	,88288	—	25,74	123,33	2,41	81,08	,8169	81	,92544	—	67,27	162,57	4,70	61,51	,6198
32	,88409	—	26,57	124,10	2,47	80,58	,8118	82	,92604	—	68,09	163,36	4,73	61,21	,6168
33	,88528	—	27,40	124,87	2,53	80,08	,8068	83	,92661	—	68,93	164,15	4,78	60,91	,6138
34	,88645	—	28,24	125,64	2,60	79,59	,8018	84	,92718	—	69 76	164,96	4,80	60,62	,6108
100 + 35	,88760	—	29,07	126,42	2,65	79,10	,7969	100 + 85	,92773	—	70,59	165,75	4,84	60,33	,6079
36	,88873	—	29,90	127,19	2,71	78,62	,7921	86	,92831	—	71,42	166,55	4,87	60,04	,6050
37	,88984	—	30,73	127,97	2,76	78,14	,7873	87	,92886	—	72,25	167,34	4,91	59,76	,6021
38	,89093	—	31,56	128,74	2,82	77,67	,7825	88	,92940	—	73,08	168,14	4,94	59,48	,5993
39	,89202	—	32,39	129,52	2,87	77,20	,7778	89	,92994	—	73,91	168,93	4,98	59,20	,5965
100 + 40	,89307	—	33,22	130,30	2,92	76,74	,7732	100 + 90	,93047	—	74,75	169,73	5,02	58,92	,5936
41	,89413	—	34,05	131,07	2,98	76,29	,7687	91	,93098	—	75,58	170,53	5,05	58,64	,5908
42	,89517	—	34,88	131,85	3,03	75,84	,7642	92	,93150	—	76,41	171,32	5,09	58,37	,5881
43	,89619	—	35,71	132,63	3,08	75,40	,7597	93	,93201	—	77,23	172,12	5,11	58,10	,5854
44	,89720	—	36,54	133,40	3,14	74,96	,7553	94	,93251	—	78,06	172,92	5,14	57,83	,5827
100 + 45	,89819	—	37,37	134,18	3,19	74,52	,7509	100 + 95	,93301	—	78,89	173,72	5,17	57,56	,5800
46	,89917	—	38,20	134,96	3,24	74,09	,7466	96	,93349	—	79,71	174,51	5,20	57,30	,5773
47	,90014	—	39,03	135,74	3,29	73,67	,7422	97	,93397	—	80,54	175,30	5,24	57,04	,5747
48	,90108	—	39,86	136,52	3,34	73,25	,7380	98	,93445	—	81,37	176,10	5,27	56,78	,5721
49	,90201	—	40,70	137,30	3,40	72,83	,7338	99	,93492	—	82,21	176,91	5,30	56,53	,5696

TABLE II. HEAT 47°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93539	100	83,05	177,71	5,34	56,27	,5669
99	,93588	—	83,90	178,53	5,37	56,01	,5643
98	,93636	—	84,76	179,36	5,40	55,75	,5617
97	,93683	—	85,63	180,20	5,43	55,49	,5592
96	,93731	—	86,52	181,06	5,46	55,23	,5565
100 + 95	,93780	—	87,42	181,93	5,49	54,96	,5538
94	,93827	—	88,35	182,83	5,52	54,70	,5511
93	,93874	—	89,30	183,75	5,55	54,42	,5483
92	,93921	—	90,27	184,70	5,57	54,15	,5455
91	,93968	—	91 26	185,66	5,60	53,87	,5427
100 + 90	,94017	—	92,28	186,64	5,64	53,58	,5398
89	,94066	—	93,32	187,64	5,68	53,29	,5369
88	,94116	—	94,38	188,67	5,71	53,00	,5340
87	,94167	—	95,46	189,73	5,73	52,71	,5310
86	,94218	—	96,57	190,81	5,76	52,41	,5280
100 + 85	,94269	—	97,70	191,90	5,80	52,11	,5250
84	,94320	—	98,87	193,04	5,83	51,81	,5219
83	,94372	—	100,06	194,19	5,87	51,50	,5188
82	,94424	—	101,28	195,38	5,90	51,18	,5157
81	,94475	—	102,53	196,60	5,93	50,87	,5125
100 + 80	,94528	—	103,81	197,84	5,97	50,54	,5092
79	,94582	—	105,13	199,12	6,01	50,22	,5060
78	,94635	—	106,47	200,43	6,04	49,89	,5027
77	,94689	—	107,86	201,78	6,08	49,55	,4993
76	,94742	—	109,28	203,17	6,11	49,22	,4959
100 + 75	,94797	—	110,74	204,59	6,15	48,88	,4925
74	,94850	—	112,23	206,05	6,18	48,53	,4890
73	,94904	—	113,76	207,55	6,21	48,18	,4855
72	,94959	—	115,34	209,09	6,25	47,82	,4819
71	,95014	—	116,97	210,70	6,27	47,47	,4782
100 + 70	,95069	—	118,64	212,33	6,31	47,10	,4745
69	,95125	—	120,35	214,01	6,34	46,73	,4708
68	,95181	—	122,12	215,74	6,38	46,35	,4670
67	,95237	—	123,94	217,53	6,41	45,97	,4632
66	,95294	—	125,82	219,37	6,45	45,58	,4593
100 + 65	,95351	—	127,76	221,27	6,49	45,19	,4553
64	,95408	—	129,76	223,24	6,52	44,79	,4513
63	,95464	—	131,82	225,26	6,56	44,39	,4473
62	,95522	—	133,95	227,36	6,59	43,99	,4431
61	,95580	—	136,14	229,53	6,61	43,57	,4389
100 + 60	,95637	—	138,42	231,76	6,66	43,15	,4347
59	,95695	—	140,75	234,07	6,68	42,72	,4304
58	,95753	—	143,19	236,47	6,72	42,29	,4260
57	,95812	—	145,70	238,94	6,76	41,85	,4216
56	,95870	—	148,31	241,52	6,79	41,40	,4172
100 + 55	,95927	—	151,00	244,19	6,81	40,95	,4126
54	,95987	—	153,77	246,95	6,82	40,49	,4080
53	,96045	—	156,66	249,81	6,85	40,02	,4033
52	,96102	—	159,68	252,81	6,87	39,55	,3985
51	,96161	—	162,83	255,92	6,91	39,07	,3937

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96219	100	166,10	259,16	6,94	38,58	,3888
49	,96276	—	169,50	262,53	6,97	38,09	,3838
48	,96334	—	173,02	266,04	6,98	37,59	,3787
47	,96391	—	176,70	269,70	7,00	37,08	,3736
46	,96449	—	180,55	273,53	7,02	36,56	,3684
100 + 45	,96507	—	184,56	277,53	7,03	36,03	,3630
44	,96562	—	188,76	281,71	7,05	35,49	,3577
43	,96619	—	193,15	286,10	7,05	34,95	,3522
42	,96675	—	197,74	290,70	7,04	34,40	,3466
41	,96732	—	202,56	295,52	7,04	33,84	,3409
100 + 40	,96788	—	207,63	300,57	7,06	33,27	,3352
39	,96843	—	212,95	305,89	7,06	32,69	,3294
38	,96898	—	218,55	311,51	7,04	32,10	,3234
37	,96953	—	224,47	317,43	7,04	31,50	,3174
36	,97007	—	230,70	323,68	7,02	30,89	,3112
100 + 35	,97064	—	237,29	330,29	7,00	30,28	,3050
34	,97119	—	244,27	337,30	6,97	29,65	,2987
33	,97176	—	251,67	344,73	6,94	29,01	,2923
32	,97231	—	259,54	352,64	6,90	28,36	,2858
31	,97288	—	267,91	361,04	6,87	27,70	,2791
100 + 30	,97344	—	276,84	370,00	6,84	27,03	,2723
29	,97401	—	286,38	379,61	6,77	26,34	,2654
28	,97458	—	296,61	389,90	6,71	25,65	,2584
27	,97516	—	307,59	400,94	6,65	24,94	,2513
26	,97675	—	319,43	412,85	6,58	24,22	,2440
100 + 25	,97634	—	332,21	425,66	6,55	23,49	,2367
24	,97697	—	346,05	439,56	6,49	22,75	,2292
23	,97759	—	361,09	454,69	6,40	21,99	,2216
22	,97823	—	377,51	471,19	6,32	21,22	,2138
21	,97889	—	395,49	489,25	6,24	20,44	,2059
100 + 20	,97956	—	415,26	509,12	6,14	19,64	,1979
19	,98024	—	437,11	531,08	6,03	18,83	,1897
18	,98095	—	461,40	555,47	5,93	18,00	,1814
17	,98167	—	488,55	582,73	5,82	17,16	,1729
16	,98242	—	519,07	613,39	5,68	16,30	,1643
100 + 15	,98320	—	553,68	648,13	5,55	15,43	,1555
14	,98401	—	593,23	687,82	5,41	14,54	,1465
13	,98485	—	638,87	733,61	5,26	13,63	,1373
12	,98573	—	692,11	787,00	5,11	12,70	,1280
11	,98666	—	755,02	850 09	4,93	11,76	,1185
100 + 10	,98762	—	830,53	925,74	4,79	10,80	,1088
9	,98864	—	922,81	1018,23	4,58	9,82	,0990
8	,98971	—	1038,15	1133,77	4,38	8,82	,0889
7	,99085	—	1186,47	1282,28	4,19	7,80	,0786
6	,99206	—	1384,22	1480 22	4,00	6,76	,0681
100 + 5	,99330	—	1061,05	1757,28	3,77	5,69	,0573
4	,99463	—	2076,31	2172,78	3,53	4,60	,0464
3	,99604	—	2768,43	2865,10	3,33	3,49	,0352
2	,99754	—	4152,58	4249,52	3,06	2,35	,0237
1	,99913	—	8305,28	8402,37	2,91	1,19	,0120

TABLE I. HEAT 48°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,83073	100	—	100,00	—	100,00	1,0069	100 + 50	,90248	100	41,50	138,07	3,43	72,43	,7293
1	,83303	—	0,83	100,72	0,11	99,28	,9998	51	,90338	—	42,33	138,85	3,48	72,02	,7252
2	,83528	—	1,66	101,44	0,22	98,58	,9927	52	,90427	—	43,16	139,63	3,53	71,62	,7211
3	,83748	—	2,49	102,17	0,32	97,88	,9857	53	,90513	—	43,99	140,42	3,57	71,21	,7171
4	,83962	—	3,32	102,90	0,42	97,19	,9787	54	,90599	—	44,82	141,21	3,61	70,82	,7131
100 + 5	,84169	—	4,16	103,63	0,53	96,50	,9717	100 + 55	,90682	—	45,65	141,98	3,67	70,43	,7091
6	,84373	—	4,98	104,37	0,61	95,81	,9649	56	,90765	—	46,48	142,77	3,71	70,04	,7053
7	,84571	—	5,81	105,11	0,70	95,14	,9581	57	,90846	—	47,31	143,56	3,75	69,65	,7014
8	,84764	—	6,64	105,85	0,79	94,47	,9514	58	,90926	—	48,14	144,35	3,79	69,27	,6976
9	,84952	—	7,47	106,59	0,88	93,81	,9448	59	,91004	—	48,97	145,13	3,84	68,90	,6938
100 + 10	,85136	—	8,30	107,34	0,96	93,16	,9381	100 + 60	,91083	—	49,80	145,92	3,88	68,53	,6900
11	,85316	—	9,13	108,09	1,04	92,52	,9316	61	,91159	—	50,64	146,71	3,93	68,16	,6864
12	,85491	—	9,96	108,84	1,12	91,88	,9253	62	,91235	—	51,46	147,50	3,96	67,79	,6827
13	,85663	—	10,80	109,59	1,21	91,25	,9189	63	,91310	—	52,29	148,29	4,00	67,43	,6790
14	,85830	—	11,62	110,34	1,28	90,63	,9126	64	,91383	—	53,12	149,08	4,04	67,07	,6754
100 + 15	,85994	—	12,45	111,09	1,36	90,01	,9064	100 + 65	,91456	—	53,95	149,87	4,08	66,72	,6719
16	,86155	—	13,28	111,85	1,43	89,40	,9003	66	,91528	—	54,78	150,66	4,12	66,37	,6684
17	,86312	—	14,11	112,61	1,50	88,80	,8943	67	,91600	—	55,61	151,46	4,15	66,02	,6649
18	,86467	—	14,93	113,37	1,56	88,21	,8883	68	,91671	—	56,44	152,24	4,20	65,68	,6614
19	,86620	—	15,76	114,13	1,63	87,62	,8823	69	,91740	—	57,27	153,03	4,24	65,35	,6580
100 + 20	,86767	—	16,60	114,89	1,71	87,04	,8764	100 + 70	,91809	—	58,10	153,82	4,28	65,01	,6540
21	,86916	—	17,43	115,65	1,78	86,47	,8707	71	,91876	—	58,93	154,61	4,32	64,68	,6513
22	,87060	—	18,26	116,41	1,85	85,90	,8650	72	,91942	—	59,76	155,41	4,35	64,35	,6480
23	,87201	—	19,09	117,17	1,92	85,34	,8593	73	,92008	—	60,59	156,20	4,39	64,02	,6447
24	,87339	—	19,92	117,94	1,98	84,79	,8537	74	,92072	—	61,42	156,99	4,43	63,70	,6414
100 + 25	,87476	—	20,75	118,71	2,04	84,24	,8482	100 + 75	,92136	—	62,25	157,78	4,47	63,38	,6382
26	,87609	—	21,58	119,47	2,11	83,70	,8428	76	,92199	—	63,08	158,57	4,51	63,06	,6350
27	,87741	—	22,41	120,24	2,17	83,17	,8374	77	,92261	—	63,91	159,37	4,54	62,75	,6318
28	,87869	—	23,25	121,02	2,23	82,64	,8321	78	,92323	—	64,74	160,17	4,57	62,44	,6287
29	,87996	—	24,07	121,78	2,29	82,11	,8269	79	,92382	—	65,57	160,95	4,62	62,13	,6256
100 + 30	,88120	—	24,90	122,55	2,35	81,60	,8216	100 + 80	,92442	—	66,40	161,75	4,65	61,82	,6225
31	,88243	—	25,73	123,33	2,40	81,09	,8165	81	,92502	—	67,23	162,55	4,68	61,52	,6195
32	,88364	—	26,56	124,10	2,46	80,58	,8114	82	,92561	—	68,05	163,35	4,70	61,22	,6165
33	,88483	—	27,39	124,87	2,52	80,08	,8064	83	,92619	—	68,89	164,14	4,75	60,92	,6135
34	,88600	—	28,22	125,64	2,58	79,59	,8014	84	,92676	—	69,72	164,94	4,78	60,63	,6105
100 + 35	,88716	—	29,05	126,41	2,64	79,11	,7965	100 + 85	,92731	—	70,55	165,73	4,82	60,34	,6076
36	,88828	—	29,88	127,19	2,69	78,63	,7917	86	,92789	—	71,38	166,53	4,85	60,05	,6047
37	,88940	—	30,71	127,96	2,75	78,15	,7869	87	,92844	—	72,21	167,32	4,89	59,77	,6018
38	,89049	—	31,54	128,74	2,80	77,68	,7821	88	,92898	—	73,04	168,12	4,92	59,48	,5990
39	,89157	—	32,37	129,51	2,86	77,21	,7774	89	,92952	—	73,87	168,91	4,96	59,20	,5962
100 + 40	,89262	—	33,21	130,29	2,92	76,75	,7728	100 + 90	,93005	—	74,71	169,71	5,00	58,92	,5933
41	,89368	—	34,04	131,07	2,97	76,30	,7683	91	,93056	—	75,54	170,51	5,03	58,65	,5905
42	,89472	—	34,87	131,84	3,03	75,85	,7638	92	,93108	—	76,37	171,30	5,07	58,37	,5878
43	,89574	—	35,69	132,62	3,07	75,40	,7593	93	,93159	—	77,19	172,10	5,09	58,10	,5851
44	,89675	—	36,52	133,39	3,13	74,96	,7549	94	,93210	—	78,02	172,90	5,12	57,84	,5824
100 + 45	,89774	—	37,35	134,17	3,18	74,53	,7505	100 + 95	,93260	—	78,85	173,70	5,15	57,57	,5797
46	,89872	—	38,18	134,95	3,23	74,10	,7462	96	,93308	—	79,67	174,48	5,19	57,31	,5771
47	,89969	—	39,01	135,73	3,28	73,67	,7418	97	,93357	—	80,50	175,28	5,22	57,05	,5745
48	,90064	—	39,84	136,51	3,33	73,26	,7376	98	,93404	—	81,33	176,08	5,25	56,79	,5719
49	,90157	—	40,67	137,29	3,38	72,84	,7335	99	,93451	—	82,16	176,88	5,28	56,53	,5693

TABLE II. HEAT 48°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93499	100	83,01	177,69	5,32	56,27	,5667
99	,93548	—	83,85	178,50	5,35	56,02	,5641
98	,93595	—	84,71	179,33	5,38	55,76	,5614
97	,93643	—	85,58	180,17	5,41	55,50	,5589
96	,93691	—	86,47	181,03	5,44	55,24	,5563
100 + 95	,93740	—	87,37	181,90	5,47	54,97	,5536
94	,93786	—	88,30	182,80	5,50	54,70	,5509
93	,93834	—	89,25	183,72	5,53	54,43	,5481
92	,93881	—	90,22	184,67	5,55	54,15	,5453
91	,93928	—	91,21	185,63	5,58	53,87	,5425
100 + 90	,93977	—	92,23	186,62	5,61	53,59	,5396
89	,94026	—	93,27	187,61	5,66	53,30	,5367
88	,94076	—	94,33	188,65	5,68	53,01	,5338
87	,94127	—	95,41	189,70	5,71	52,71	,5308
86	,94178	—	96,52	190,78	5,74	52,42	,5278
100 + 85	,94229	—	97,65	191,87	5,78	52,12	,5248
84	,94280	—	98,81	193,01	5,80	51,82	,5217
83	,94333	—	100,01	194,16	5,85	51,51	,5186
82	,94385	—	101,22	195,34	5,88	51,19	,5155
81	,94437	—	102,47	196,56	5,91	50,87	,5123
100 + 80	,94490	—	103,75	197,81	5,94	50,55	,5090
79	,94544	—	105,07	199,09	5,98	50,23	,5058
78	,94597	—	106,42	200,40	6,02	49,90	,5025
77	,94651	—	107,80	201,74	6,06	49,56	,4991
76	,94705	—	109,22	203,14	6,08	49,22	,4957
100 + 75	,94759	—	110,68	204,55	6,13	48,88	,4923
74	,94812	—	112,17	206,02	6,15	48,53	,4888
73	,94867	—	113,70	207,51	6,19	48,18	,4853
72	,94922	—	115,28	209,06	6,22	47,83	,4817
71	,94977	—	116,91	210,66	6,25	47,47	,4780
100 + 70	,95032	—	118,58	212,29	6,29	47,11	,4743
69	,95088	—	120,29	213,97	6,32	46,73	,4706
68	,95144	—	122,06	215,70	6,36	46,36	,4668
67	,95201	—	123,88	217,49	6,39	45,98	,4630
66	,95258	—	125,76	219,33	6,43	45,59	,4591
100 + 65	,95315	—	127,70	221,23	6,47	45,20	,4551
64	,95372	—	129,69	223,19	6,50	44,80	,4511
63	,95429	—	131,75	225,22	6,53	44,40	,4471
62	,95487	—	133,88	227,32	6,56	43,99	,4429
61	,95545	—	136,07	229,48	6,59	43,58	,4388
100 + 60	,95602	—	138,35	231,71	6,64	43,16	,4346
59	,95661	—	140,68	234,02	6,66	42,73	,4303
58	,95720	—	143,11	236,41	6,70	42,30	,4259
57	,95779	—	145,62	238,89	6,73	41,86	,4215
56	,95837	—	148,23	241,47	6,76	41,41	,4170
100 + 55	,95894	—	150,92	244,13	6,79	40,96	,4124
54	,95955	—	153,69	246,89	6,80	40,50	,4079
53	,96013	—	156,58	249,75	6,83	40,03	,4032
52	,96071	—	159,59	252,74	6,85	39,56	,3984
51	,96130	—	162,74	255,86	6,88	39,08	,3936

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96188	100	166,01	259,10	6,91	38,59	,3886
49	,96246	—	169,41	262,46	6,95	38,10	,3836
48	,96304	—	172,93	265,97	6,96	37,60	,3786
47	,96362	—	176,60	269,63	6,97	37,09	,3735
46	,96420	—	180,45	273,46	6,99	36,57	,3683
100 + 45	,96479	—	184,46	277,46	7,00	36,04	,3629
44	,96534	—	188,66	281,63	7,03	35,50	,3575
43	,96521	—	193,04	286,02	7,02	34,96	,3521
42	,96648	—	197,63	290,61	7,02	34,41	,3465
41	,96705	—	202,45	295,43	7,02	33,85	,3408
100 + 40	,96762	—	207,52	300,48	7,04	33,28	,3351
39	,96817	—	212,84	305,80	7,04	32,70	,3293
38	,96873	—	218,43	311,41	7,02	32,11	,3233
37	,96929	—	224,35	317,32	7,03	31,51	,3173
36	,96985	—	230,57	323,57	7,00	30,90	,3112
100 + 35	,97041	—	237,10	330,18	6,98	30,29	,3050
34	,97097	—	244,14	337,18	6,96	29,68	,2987
33	,97154	—	251,53	344,61	6,92	29,02	,2922
32	,97210	—	259,40	352,51	6,89	28,37	,2857
31	,97267	—	267,76	360,91	6,85	27,71	,2790
100 + 30	,97324	—	276,69	369,87	6,82	27,04	,2722
29	,97382	—	286,23	379,47	6,76	26,35	,2653
28	,97440	—	296,45	389,74	6,71	25,66	,2583
27	97499	—	307,43	400,78	6,65	24,95	,2512
26	,97659	—	319,26	412,68	6,58	24,23	,2440
100 + 25	,97619	—	332,03	425,48	6,55	23,50	,2367
24	,97682	—	345,80	439,38	6,48	22,76	,2292
23	,97745	—	360,90	454,49	6,41	22,00	,2216
22	,97810	—	377,31	470,98	6,33	21,23	,2138
21	,97876	—	395,28	489,03	6,25	20,45	,2059
100 + 20	,97944	—	415,04	508,89	6,15	19,65	,1979
19	,98013	—	436,88	530,84	6,04	18,84	,1897
18	,98084	—	461,15	555,21	5,94	18,01	,1813
17	,98157	—	488,29	582,46	5,83	17,17	,1728
16	,98232	—	518,79	613,10	5,69	16,31	,1642
100 + 15	,98311	—	553,38	647,82	5,56	15,44	,1554
14	,98393	—	592,91	687,49	5,42	14,55	,1464
13	,98477	—	638,53	733,25	5,28	13,64	,1373
12	,98566	—	691,74	786,61	5,13	12,71	,1280
11	,98660	—	754,62	849,66	4,96	11,77	,1185
100 + 10	,98756	—	830,08	925,27	4,81	10,80	,1088
9	,98858	—	922,32	1017,70	4,62	9,82	,0990
8	,98966	—	1037,60	1133,18	4,42	8,82	,0889
7	,99080	—	1185,84	1281,61	4,23	7,80	,0786
6	,99201	—	1383,48	1479,44	4,04	6,76	,0681
100 + 5	,99326	—	1660,17	1756,36	3,81	5,69	,0573
4	,99459	—	2075,71	2171,63	3,58	4,61	,0464
3	,99600	—	2766,95	2863,58	3,37	3,49	,0352
2	,99750	—	4150,38	4247,26	3,12	2,36	,0237
1	,99909	—	8300,85	8397,88	2,97	1,19	,0120

TABLE I. HEAT 49°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,83025	100	—	100,00	—	100,00	1,0064
1	,83256	—	0,83	100,72	0,11	99,28	,9992
2	,83481	—	1,66	101,44	0,22	98,58	,9921
3	,83701	—	2,49	102,17	0,32	97,88	,9851
4	,83915	—	3,32	102,90	0,42	97,19	,9781
100 + 5	,84122	—	4,16	103,63	0,53	96,50	,9711
6	,84326	—	4,98	104,37	0,61	95,81	,9643
7	,84524	—	5,81	105,11	0,70	95,14	,9576
8	,84717	—	6,64	105,84	0,80	94,48	,9509
9	,84905	—	7,47	106,59	0,88	93,82	,9443
100 + 10	,85089	—	8,30	107,33	0,97	93,17	,9370
11	,85269	—	9,13	108,08	1,05	92,53	,9311
12	,85444	—	9,96	108,83	1,13	91,89	,9247
13	,85616	—	10,79	109,58	1,21	91,26	,9184
14	,85784	—	11,62	110,34	1,28	90,63	,9121
100 + 15	,85948	—	12,45	111,09	1,36	90,02	,9059
16	,86109	—	13,28	111,85	1,43	89,41	,8998
17	,86266	—	14,10	112,60	1,50	88,80	,8938
18	,86421	—	14,93	113,36	1,57	88,21	,8878
19	,86574	—	15,75	114,12	1,63	87,62	,8819
100 + 20	,86721	—	16,59	114,89	1,70	87,04	,8760
21	,86870	—	17,42	115,64	1,78	86,47	,8702
22	,87014	—	18,25	116,41	1,84	85,90	,8645
23	,87155	—	19,08	117,17	1,91	85,34	,8589
24	,87293	—	19,91	117,94	1,97	84,79	,8533
100 + 25	,87430	—	20,74	118,70	2,04	84,25	,8478
26	,87564	—	21,57	119,47	2,10	83,71	,8423
27	,87695	—	22,40	120,24	2,16	83,17	,8369
28	,87824	—	23,24	121,01	2,23	82,64	,8317
29	,87951	—	24,06	121,78	2,28	82,12	,8265
100 + 30	,88075	—	24,89	122,55	2,34	81,60	,8212
31	,88198	—	25,71	123,32	2,39	81,09	,8161
32	,88319	—	26,54	124,09	2,45	80,59	,8110
33	,88438	—	27,37	124,86	2,51	80,09	,8060
34	,88555	—	28,21	125,63	2,58	79,60	,8010
100 + 35	,88671	—	29,03	120,40	2,63	79,11	,7961
36	,88784	—	29,87	127,18	2,69	78,63	,7913
37	,88895	—	30,70	127,95	2,75	78,15	,7865
38	,89004	—	31,53	128,73	2,80	77,68	,7817
39	,89113	—	32,36	129,50	2,86	77,21	,7770
100 + 40	,89218	—	33,19	130,28	2,91	76,75	,7724
41	,89324	—	34,02	131,06	2,96	76,30	,7679
42	,89427	—	34,85	131,83	3,02	75,85	,7634
43	,89530	—	35,67	132,61	3,06	75,41	,7589
44	,89630	—	36,50	133,39	3,11	74,97	,7545
100 + 45	,89729	—	37,33	134,17	3,16	74,53	,7501
46	,89827	—	38,16	134,94	3,22	74,10	,7458
47	,89924	—	38,99	135,72	3,27	73,68	,7415
48	,90019	—	39,82	136,50	3,32	73,26	,7373
49	,90113	—	40,65	137,28	3,37	72,84	,7331

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,90204	100	41,48	138,06	3,42	72,43	,7289
51	,90294	—	42,31	138,84	3,47	72,02	,7248
52	,90383	—	43,14	139,62	3,52	71,62	,7207
53	,90470	—	43,97	140,41	3,56	71,22	,7167
54	,90556	—	44,80	141,19	3,61	70,82	,7127
100 + 55	,90639	—	45,63	141,97	3,66	70,43	,7088
56	,90722	—	46,46	142,76	3,70	70,04	,7050
57	,90803	—	47,28	143,55	3,73	69,66	,7011
58	,90883	—	48,12	144,34	3,78	69,28	,6973
59	,90962	—	48,94	145,12	3,82	68,90	,6935
100 + 60	,91040	—	49,77	145,91	3,86	68,53	,6897
61	,91116	—	50,61	146,70	3,91	68,17	,6861
62	,91192	—	51,45	147,49	3,94	67,80	,6824
63	,91267	—	52,26	148,28	3,98	67,44	,6787
64	,91340	—	53,09	149,07	4,02	67,08	,6751
100 + 65	,91413	—	53,92	149,86	4,06	66,73	,6715
66	,91485	—	54,75	150,65	4,10	66,38	,6681
67	,91557	—	55,58	151,44	4,14	66,03	,6646
68	,91628	—	56,41	152,23	4,18	65,69	,6611
69	,91697	—	57,24	153,01	4,23	65,35	,6577
100 + 70	,91766	—	58,07	153,81	4,26	65,02	,6543
71	,91833	—	58,90	154,60	4,30	64,69	,6510
72	,91899	—	59,73	155,39	4,34	64,36	,6477
73	,91965	—	60,56	156,19	4,37	64,03	,6444
74	,92029	—	61,39	156,97	4,42	63,70	,6411
100 + 75	,92094	—	62,22	157,77	4,45	63,38	,6379
76	,92156	—	63,05	158,55	4,50	63,06	,6347
77	,92218	—	63,88	159,35	4,53	62,75	,6315
78	,92280	—	64,71	160,15	4,56	62,44	,6284
79	,92340	—	65,54	160,93	4,61	62,14	,6253
100 + 80	,92400	—	66,37	161,73	4,64	61,83	,6222
81	,92459	—	67,19	162,53	4,66	61,53	,6192
82	,92518	—	68,02	163,33	4,69	61,23	,6162
83	,92577	—	68,85	164,12	4,73	60,93	,6132
84	,92633	—	69,68	164,92	4,76	60,63	,6102
100 + 85	,92689	—	70,51	165,71	4,80	60,34	,6073
86	,92746	—	71,34	166,51	4,83	60,05	,6044
87	,92801	—	72,17	167,30	4,87	59,77	,6015
88	,92855	—	73,00	168,10	4,90	59,49	,5987
89	,92909	—	73,83	168,89	4,94	59,21	,5959
100 + 90	,92962	—	74,67	169,89	4,98	58,93	,5930
91	,93014	—	75,50	170,49	5,01	58,65	,5902
92	,93066	—	76,33	171,28	5,05	58,38	,5875
93	,93118	—	77,15	172,08	5,07	58,11	,5848
94	,93169	—	77,98	172,87	5,11	57,84	,5821
100 + 95	,93219	—	78,81	173,68	5,13	57,58	,5794
96	,93267	—	79,63	174,46	5,17	57,32	,5768
97	,93316	—	80,46	175,26	5,20	57,06	,5742
98	,93364	—	81,29	176,05	5,24	56,80	,5716
99	,93411	—	82,12	176,86	5,26	56,54	,5690

TABLE II. HEAT 49°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93459	100	82,96	177,67	5,29	56,28	,5664	100 + 50	,96157	100	165,92	259,03	6,89	38,60	,3885
99	,93507	—	83,81	178,48	5,33	56,02	,5638	49	,96216	—	169,32	262,39	6,93	38,11	,3835
98	,93555	—	84,67	179,31	5,36	55,76	,5612	48	,96274	—	172,84	265,90	6,94	37,61	,3785
97	,93602	—	85,54	180,15	5,39	55,50	,5586	47	,96333	—	176,51	269,56	6,95	37,10	,3734
96	,93651	—	86,44	181,01	5,43	55,24	,5560	46	,96391	—	180,35	273,38	6,97	36,58	,3681
100 + 95	,93699	—	87,32	181,88	5,44	54,98	,5533	100 + 45	,96451	—	184,36	277,38	6,98	36,05	,3628
94	,93746	—	88,25	182,78	5,47	54,71	,5506	44	,96506	—	188,56	281,55	7,01	35,51	,3574
93	,93794	—	89,20	183,70	5,50	54,44	,5478	43	,96564	—	192,94	285,94	7,00	34,97	,3520
92	,93841	—	90,17	184,65	5,52	54,16	,5450	42	,96621	—	197,53	290,53	7,00	34,42	,3464
91	,93888	—	91,16	185,61	5,55	53,88	,5422	41	,96678	—	202,34	295,34	7,00	33,86	,3407
100 + 90	,93937	—	92,18	186,59	5,59	53,59	,5393	100 + 40	,96736	—	207,41	300,39	7,02	33,29	,3350
89	,93986	—	93,22	187,59	5,63	53,30	,5365	39	,96791	—	212,73	305,71	7,02	32,71	,3292
88	,94036	—	94,28	188,62	5,66	53,01	,5336	38	,96848	—	218,32	311,32	7,00	32,12	,3233
87	,94087	—	95,36	189,67	5,69	52,72	,5306	37	,96905	—	224,23	317,22	7,01	31,52	,3172
86	,94138	—	96,47	190,75	5,72	52,42	,5276	36	,96960	—	230,45	323,46	6,99	30,91	,3111
100 + 85	,94189	—	97,60	191,85	5,75	52,12	,5245	100 + 35	,97018	—	237,03	330,06	6,97	30,30	,3049
84	,94241	—	98,76	192,98	5,78	51,82	,5215	34	,97075	—	244,01	337,06	6,95	29,67	,2986
83	,94294	—	99,95	194,13	5,82	51,51	,5184	33	,97132	—	251,40	344,48	6,92	29,03	,2922
82	,94346	—	101,17	195,31	5,86	51,20	,5153	32	,97189	—	259,26	352,38	6,88	28,38	,2857
81	,94399	—	102,42	196,53	5,89	50,88	,5121	31	,97246	—	267,62	360,77	6,85	27,72	,2790
100 + 80	,94452	—	103,70	197,78	5,92	50,56	,5088	100 + 30	,97304	—	276,54	369,73	6,81	27,05	,2722
79	,94506	—	105,02	199,05	5,97	50,24	,5056	29	,97363	—	286,08	379,32	6,76	26,36	,2653
78	,94559	—	106,36	200,36	6,00	49,91	,5023	28	,97422	—	296,29	389,59	6,70	25,67	,2583
77	,94613	—	107,74	201,71	6,03	49,57	,4989	27	,97482	—	307,27	400,62	6,65	24,96	,2512
76	,94667	—	109,16	203,10	6,06	49,23	,4955	26	,97643	—	319,09	412,51	6,58	24,24	,2439
100 + 75	,94721	—	110,62	204,52	6,10	48,89	,4921	100 + 25	,97604	—	331,85	425,31	6,54	23,51	,2366
74	,94775	—	112,11	205,98	6,13	48,54	,4886	24	,97667	—	345,68	439,20	6,48	22,77	,2292
73	,94830	—	113,64	207,48	6,16	48,19	,4851	23	,97731	—	360,71	454,30	6,41	22,01	,2215
72	,94885	—	115,22	209,02	6,20	47,84	,4815	22	,97797	—	377,11	470,78	6,33	21,24	,2137
71	,94940	—	116,85	210,62	6,23	47,48	,4778	21	,97864	—	395,07	488,82	6,25	20,46	,2058
100 + 70	,94995	—	118,52	212,25	6,27	47,11	,4741	100 + 20	,97932	—	414,82	508,66	6,16	19,66	,1978
69	,95051	—	120,23	213,93	6,30	46,74	,4704	19	,98002	—	436,65	530,60	6,05	18,85	,1896
68	,95108	—	122,00	215,66	6,34	46,37	,4666	18	,98073	—	460,91	554,96	5,95	18,02	,1813
67	,95165	—	123,82	217,45	6,37	45,99	,4628	17	,98147	—	488,03	582,19	5,84	17,18	,1728
66	,95222	—	125,70	219,29	6,41	45,60	,4589	16	,98223	—	518,52	612,81	5,71	16,32	,1642
100 + 65	,95279	—	127,63	221,19	6,44	45,21	,4550	100 + 15	,98302	—	553,09	647,51	5,58	15,44	,1554
64	,95336	—	129,62	223,15	6,47	44,81	,4510	14	,98385	—	592,60	687,16	5,44	14,55	,1464
63	,95394	—	131,68	225,17	6,51	44,41	,4469	13	,98470	—	638,19	732,89	5,30	13,64	,1373
62	,95452	—	133,81	227,26	6,55	44,00	,4428	12	,98559	—	691,37	786,22	5,15	12,72	,1280
61	,95510	—	136,00	229,43	6,57	43,59	,4386	11	,98654	—	754,22	849,23	4,99	11,78	,1185
100 + 60	,95568	—	138,27	231,66	6,61	43,17	,4344	100 + 10	,98750	—	829,64	924,80	4,84	10,81	,1088
59	,95627	—	140,60	233,97	6,63	42,74	,4301	9	,98853	—	921,83	1017,18	4,65	9,83	,0989
58	,95687	—	143,04	236,36	6,68	42,31	,4258	8	,98961	—	1037,05	1132,60	4,45	8,83	,0888
57	,95746	—	145,54	238,83	6,71	41,87	,4214	7	,99075	—	1185,21	1280,94	4,27	7,81	,0786
56	,95804	—	148,15	241,41	6,74	41,42	,4169	6	,99196	—	1382,74	1478,67	4,07	6,76	,0681
100 + 55	,95862	—	150,84	244,07	6,77	40,97	,4123	100 + 5	,99321	—	1659,29	1755,44	3,85	5,70	,0573
54	,95923	—	153,61	246,83	6,78	40,51	,4078	4	,99454	—	2074,11	2170,49	3,62	4,61	,0464
53	,95981	—	156,50	249,69	6,81	40,04	,4031	3	,99596	—	2765,48	2862,07	3,41	3,49	,0352
52	,96040	—	159,51	252,68	6,83	39,57	,3983	2	,99746	—	4148,20	4245,02	3,18	2,36	,0237
51	,96099	—	162,65	255,80	6,85	39,09	,3935	1	,99905	—	8296,45	8393,42	3,03	1,19	,0120

TABLE I. HEAT 50°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82977	100	—	100,00	—	100,00	1,0058	100 + 50	,90160	100	41,46	138,05	3,41	72,44	,7286
1	,83208	—	0,83	100,72	0,11	99,29	,9986	51	,90250	—	42,29	138,83	3,46	72,03	,7245
2	,83434	—	1,66	101,44	0,22	98,58	,9915	52	,90339	—	43,12	139,61	3,51	71,63	,7204
3	,83654	—	2,49	102,16	0,33	97,88	,9845	53	,90426	—	43,95	140,40	3,55	71,23	,7164
4	,83868	—	3,32	102,89	0,43	97,19	,9776	54	,90512	—	44,78	141,18	3,60	70,83	,7124
100 + 5	,84076	—	4,15	103,63	0,52	96,50	,9700	100 + 55	,90596	—	45,61	141,96	3,65	70,44	,7085
6	,84279	—	4,97	104,36	0,61	95,82	,9637	56	,90679	—	46,43	142,75	3,68	70,05	,7046
7	,84477	—	5,80	105,10	0,70	95,15	,9570	57	,90760	—	47,26	143,54	3,72	69,67	,7007
8	,84670	—	6,63	105,84	0,79	94,48	,9503	58	,90840	—	48,09	144,33	3,76	69,29	,6969
9	,84858	—	7,46	106,58	0,88	93,82	,9437	59	,90919	—	48,92	145,11	3,81	68,91	,6931
100 + 10	,85042	—	8,29	107,33	0,96	93,17	,9371	100 + 60	,90997	—	49,75	145,90	3,85	68,54	,6894
11	,85222	—	9,12	108,08	1,04	92,53	,9306	61	,91073	—	50,58	146,69	3,89	68,17	,6857
12	,85397	—	9,95	108,83	1,12	91,89	,9242	62	,91149	—	51,41	147,48	3,93	67,81	,6820
13	,85569	—	10,78	109,58	1,20	91,26	,9179	63	,91224	—	52,24	148,26	3,98	67,45	,6784
14	,85738	—	11,61	110,33	1,28	90,64	,9116	64	,91297	—	53,07	149,06	4,01	67,09	,6748
100 + 15	,85902	—	12,44	111,08	1,36	90,02	,9054	100 + 65	,91370	—	53,90	149,85	4,05	66,74	,6712
16	,86063	—	13,27	111,84	1,43	89,41	,8993	66	,91442	—	54,73	150,64	4,09	66,39	,6677
17	,86220	—	14,09	112,60	1,49	88,81	,8933	67	,91514	—	55,56	151,42	4,14	66,04	,6642
18	,86375	—	14,92	113,36	1,56	88,22	,8873	68	,91585	—	56,38	152,21	4,17	65,70	,6608
19	,86527	—	15,75	114,12	1,63	87,63	,8814	69	,91654	—	57,21	153,00	4,21	65,36	,6574
100 + 20	,86676	—	16,58	114,88	1,70	87,05	,8755	100 + 70	,91723	—	58,04	153,79	4,25	65,02	,6540
21	,86823	—	17,41	115,64	1,77	86,48	,8697	71	,91790	—	58,87	154,58	4,29	64,69	,6507
22	,86967	—	18,24	116,40	1,84	85,91	,8640	72	,91856	—	59,70	155,37	4,33	64,36	,6474
23	,87108	—	19,07	117,16	1,91	85,35	,8584	73	,91922	—	60,53	156,17	4,36	64,03	,6441
24	,87247	—	19,90	117,93	1,97	84,80	,8520	74	,91986	—	61,36	156,96	4,40	63,71	,6408
100 + 25	,87384	—	20,73	118,70	2,03	84,25	,8474	100 + 75	,92051	—	62,19	157,75	4,44	63,39	,6376
26	,87518	—	21,56	119,46	2,10	83,71	,8419	76	,92113	—	63,02	158,54	4,48	63,07	,6344
27	,87649	—	22,39	120,23	2,16	83,18	,8365	77	,92175	—	63,85	159,33	4,52	62,76	,6312
28	,87778	—	23,22	121,00	2,22	82,65	,8312	78	,92237	—	64,68	160,13	4,55	62,45	,6281
29	,87905	—	24,05	121,77	2,28	82,12	,8260	79	,92298	—	65,51	160,92	4,59	62,14	,6250
100 + 30	,88030	—	24,88	122,54	2,34	81,61	,8208	100 + 80	,92358	—	66,34	161,72	4,62	61,84	,6219
31	,88153	—	25,70	123,31	2,39	81,10	,8157	81	,92417	—	67,16	162,51	4,65	61,53	,6189
32	,88274	—	26,53	124,08	2,45	80,59	,8106	82	,92476	—	67,99	163,31	4,68	61,23	,6159
33	,88393	—	27,36	124,85	2,51	80,09	,8056	83	,92534	—	68,82	164,10	4,72	60,94	,6129
34	,88510	—	28,19	125,62	2,57	79,60	,8006	84	,92591	—	69,65	164,90	4,75	60,64	,6099
100 + 35	,88626	—	29,02	126,40	2,62	79,12	,7957	100 + 85	,92648	—	70,48	165,69	4,79	60,35	,6070
36	,88739	—	29,85	127,17	2,68	78,64	,7909	86	,92703	—	71,31	166,49	4,82	60,06	,6041
37	,88850	—	30,68	127,94	2,74	78,16	,7861	87	,92758	—	72,14	167,28	4,86	59,78	,6012
38	,88960	—	31,51	128,72	2,79	77,69	,7814	88	,92812	—	72,97	168,08	4,89	59,50	,5984
39	,89068	—	32,34	129,49	2,85	77,22	,7767	89	,92866	—	73,80	168,87	4,93	59,22	,5956
100 + 40	,89174	—	33,17	130,27	2,90	76,76	,7721	100 + 90	,92919	—	74,63	169,67	4,96	58,94	,5928
41	,89279	—	34,00	131,05	2,95	76,31	,7675	91	,92972	—	75,46	170,47	4,99	58,66	,5900
42	,89382	—	34,83	131,82	3,01	75,86	,7630	92	,93024	—	76,29	171,26	5,03	58,39	,5872
43	,89484	—	35,65	132,60	3,05	75,41	,7585	93	,93076	—	77,11	172,06	5,05	58,12	,5845
44	,89585	—	36,48	133,38	3,10	74,97	,7541	94	,93127	—	77,94	172,85	5,09	57,85	,5818
100 + 45	,89684	—	37,31	134,16	3,15	74,54	,7497	100 + 95	,93177	—	78,77	173,65	5,12	57,59	,5792
46	,89782	—	38,14	134,93	3,21	74,11	,7454	96	,93226	—	79,59	174,44	5,15	57,33	,5766
47	,89879	—	38,97	135,71	3,26	73,69	,7411	97	,93275	—	80,42	175,23	5,19	57,07	,5740
48	,89974	—	39,80	136,49	3,31	73,27	,7369	98	,93323	—	81,25	176,03	5,22	56,81	,5714
49	,90068	—	40,63	137,27	3,36	72,85	,7327	99	,93371	—	82,08	176,83	5,25	56,55	,5688

TABLE II. HEAT 50°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93419	100	82,92	177,64	5,28	56,29	,5662	100 + 50	,96126	100	165,84	258,96	6,88	38,61	,3884
99	,93467	—	83,76	178,46	5,30	56,03	,5636	49	,96185	—	169,23	262,32	6,91	38,12	,3834
98	,93515	—	84,62	179,29	5,33	55,77	,5610	48	,96244	—	172,75	265,83	6,92	37,62	,3783
97	,93562	—	85,50	180,13	5,37	55,51	,5584	47	,96303	—	176,42	269,49	6,93	37,11	,3732
96	,93610	—	86,38	180,98	5,40	55,25	,5558	46	,96361	—	180,26	273,31	6,95	36,59	,3680
100 + 95	,93658	—	87,28	181,85	5,43	54,99	,5531	100 + 45	,96420	—	184,27	277,30	6,97	36,06	,3627
94	,93705	—	88,21	182,75	5,46	54,72	,5504	44	,96478	—	188,46	281,48	6,98	35,52	,3573
93	,93753	—	89,16	183,67	5,	54,44	,5476	43	,96536	—	192,84	285,86	6,98	34,98	,3518
92	,93801	—	90,13	184,62	5,51	54,17	,5448	42	,96593	—	197,43	290,45	6,98	34,43	,3463
91	,93848	—	91,12	185,58	5,54	53,89	,5420	41	,96651	—	202,24	295,26	6,98	33,87	,3406
100 + 90	,93897	—	92,13	186,56	5,57	53,60	,5391	100 + 40	,96708	—	207,30	300,31	6,99	33,30	,3349
89	,93946	—	93,17	187,56	5,61	53,31	,5362	39	,96765	—	212,62	305,62	7,00	32,72	,3291
88	,93996	—	94,23	188,59	5,64	53,02	,5333	38	,96823	—	218,21	311,22	6,99	32,13	,3232
87	,94047	—	95,31	189,64	5,67	52,73	,5303	37	,96880	—	224,11	317,12	6,99	31,53	,3171
86	,94098	—	96,42	190,72	5,70	52,43	,5273	36	,96938	—	230,33	323,35	6,98	30,92	,3110
100 + 85	,94149	—	97,55	191,82	5,73	52,13	,5243	100 + 35	,96995	—	236,91	329,95	6,96	30,31	,3048
84	,94201	—	98,71	192,95	5,76	51,83	,5213	34	,97052	—	243,88	336,94	6,94	29,68	,2985
83	,94254	—	99,90	194,10	5,80	51,52	,5182	33	,97110	—	251,27	344,36	6,91	29,04	,2921
82	,94307	—	101,12	195,28	5,84	51,21	,5150	32	,97167	—	259,13	352,25	6,88	28,39	,2856
81	,94360	—	102,37	196,50	5,87	50,89	,5118	31	,97225	—	267,48	360,64	6,84	27,73	,2789
100 + 80	,94414	—	103,65	197,74	5,91	50,57	,5086	100 + 30	,97284	—	276,40	369,60	6,80	27,06	,2721
79	,94467	—	104,96	199,02	5,94	50,25	,5054	29	,97343	—	285,93	379,18	6,75	26,37	,2652
78	,94521	—	106,31	200,33	5,98	49,92	,5021	28	,97403	—	296,14	389,44	6,70	25,68	,2582
77	,94575	—	107,69	201,68	6,01	49,58	,4988	27	,97464	—	307,11	400,46	6,65	24,97	,2511
76	,94630	—	109,11	203,06	6,05	49,24	,4954	26	,97526	—	318,92	412,34	6,58	24,25	,2439
100 + 75	,94683	—	110,56	204,48	6,08	48,90	,4919	100 + 25	,97589	—	331,68	425,14	6,54	23,52	,2366
74	,94737	—	112,05	205,94	6,11	48,55	,4884	24	,97652	—	345,50	439,02	6,48	22,78	,2291
73	,94792	—	113,58	207,44	6,14	48,20	,4849	23	,97717	—	360,52	454,11	6,41	22,02	,2215
72	,94847	—	115,16	208,99	6,17	47,85	,4813	22	,97783	—	376,91	470,58	6,33	21,25	,2137
71	,94902	—	116,79	210,58	6,21	47,49	,4776	21	,97851	—	394,86	488,61	6,25	20,46	,2058
100 + 70	,94958	—	118,46	212,21	6,25	47,12	,4739	100 + 20	,97920	—	414,60	508,44	6,16	19,67	,1978
69	,95014	—	120,17	213,89	6,28	46,75	,4702	19	,97990	—	436,42	530,36	6,06	18,86	,1896
68	,95071	—	121,94	215,62	6,32	46,38	,4664	18	,98062	—	460,67	554,71	5,96	18,03	,1813
67	,95128	—	123,76	217,41	6,35	46,00	,4626	17	,98136	—	487,77	581,92	5,85	17,18	,1728
66	,95185	—	125,64	219,25	6,39	45,61	,4587	16	,98213	—	518,25	612,53	5,72	16,32	,1642
100 + 65	,95243	—	127,57	221,15	6,42	45,22	,4548	100 + 15	,98293	—	552,80	647,20	5,60	15,45	,1554
64	,95300	—	129,56	223,11	6,45	44,82	,4508	14	,98376	—	592,29	686,83	5,46	14,56	,1464
63	,95358	—	131,61	225,13	6,48	44,42	,4467	13	,98462	—	637,85	732,53	5,32	13,65	,1373
62	,95416	—	133,74	227,22	6,52	44,01	,4426	12	,98552	—	691,00	785,83	5,17	12,72	,1280
61	,95475	—	135,93	229,38	6,55	43,60	,4384	11	,98647	—	753,82	848,80	5,02	11,78	,1185
100 + 60	,95534	—	138,20	231,61	6,59	43,18	,4342	100 + 10	,98745	—	829,20	924,33	4,87	10,82	,1088
59	,95593	—	140,53	233,92	6,61	42,75	,4299	9	,98847	—	921,34	1016,66	4,68	9,84	,0989
58	,95653	—	142,96	236,30	6,66	42,32	,4256	8	,98955	—	1036,50	1132,02	4,48	8,83	,0888
57	,95712	—	145,47	238,78	6,69	41,88	,4212	7	,99070	—	1184,58	1280,28	4,30	7,81	,0786
56	,95771	—	148,07	241,35	6,72	41,43	,4167	6	,99190	—	1382,00	1477,90	4,10	6,77	,0681
100 + 55	,95831	—	150,76	244,01	6,75	40,98	,4122	100 + 5	,99316	—	1656,41	1754,52	3,89	5,70	,0573
54	,95890	—	153,53	246,77	6,76	40,52	,4076	4	,99449	—	2073,01	2169,35	3,66	4,61	,0464
53	,95949	—	156,42	249,63	6,79	40,05	,4029	3	,99591	—	2764,02	2860,57	3,45	3,50	,0352
52	,96008	—	159,43	252,62	6,81	39,58	,3981	2	,99742	—	4146,03	4242,79	3,24	2,36	,0237
51	,96067	—	162,57	255,73	6,84	39,10	,3933	1	,99901	—	8292,06	8388,98	3,08	1,19	,0120

TABLE I. HEAT 51°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82929	100	—	100,00	—	100,00	1,0052	100 + 50	,90115	100	41,44	138,04	3,40	72,44	,7282
1	,83160	—	0,83	100,72	0,11	99,29	,9981	51	,90205	—	42,27	138,82	3,45	72,03	,7241
2	,83386	—	1,66	101,44	0,22	98,58	,9910	52	,90294	—	43,09	139,60	3,49	71,63	,7201
3	,83606	—	2,49	102,16	0,33	97,88	,9840	53	,90381	—	43,92	140,38	3,54	71,23	,7161
4	,83820	—	3,32	102,89	0,43	97,19	,9770	54	,90467	—	44,75	141,17	3,58	70,84	,7121
100 + 5	,84028	—	4,15	103,63	0,52	96,50	,9700	100 + 55	,90551	—	45,58	141,95	3,63	70,45	,7081
6	,84231	—	4,97	104,36	0,61	95,82	,9632	56	,90634	—	46,40	142,74	3,66	70,06	,7042
7	,84429	—	5,80	105,10	0,70	95,15	,9565	57	,907 57	—	47,23	143,52	3,71	69,67	,7004
8	,84622	—	6,63	105,84	0,79	94,48	,9498	58	,90795	—	48,06	144,31	3,75	69,29	,6966
9	,84810	—	7,46	106,58	0,88	93,82	,9432	59	,90874	—	48,89	145,09	3,80	68,92	,6928
100 + 10	,84994	—	8,29	107,33	0,96	93,17	,9366	100 + 60	,90952	—	49,72	145,88	3,84	68,55	,6890
11	,85174	—	9,12	108,08	1,04	92,53	,9301	61	,91028	—	50,55	146,67	3,88	68,18	,6853
12	,85350	—	9,94	108,83	1,11	91,89	,9237	62	,91104	—	51,38	147,46	3,92	67,81	,6817
13	,85522	—	10,78	109,58	1,20	91,26	,9174	63	,91179	—	52,21	148,24	3,97	67,45	,6781
14	,85691	—	11,60	110,33	1,27	90,64	,9111	64	,91252	—	53,04	149 04	4,00	67,09	,6745
100 + 15	,85855	—	12,43	111,08	1,35	90,02	,9049	100 + 65	,91324	—	53,87	149 83	4,04	66,74	,6709
16	,86016	—	13,26	111,84	1,42	89,41	,8988	66	,91397	—	54,70	150,62	4,08	66,39	,6674
17	,86173	—	14,09	112,59	1,50	88,81	,8928	67	,91469	—	55,53	151,40	4,13	66,04	,6639
18	,86328	—	14,92	113,35	1,57	88,22	,8868	68	,91541	—	56,35	152,19	4,16	65,70	,6605
19	,86480	—	15,74	114,11	1,63	87,63	,8809	69	,91610	—	57,18	152,98	4,20	65,36	,6571
100 + 20	,86629	—	16,57	114,88	1,69	87,05	,8750	100 + 70	,91679	—	58,01	153,77	4,24	65,03	,6537
21	,86776	—	17,40	115,64	1,76	86,48	,8692	71	,91747	—	58,84	154,56	4,28	64,70	,6504
22	,86920	—	18,23	116,40	1,83	85,91	,8635	72	,91813	—	59,67	155,35	4,32	64,37	,6471
23	,87062	—	19,06	117,16	1,90	85,35	,8579	73	,91879	—	60,49	156,15	4,34	64,04	,6438
24	,87201	—	19,89	117,93	1,96	84,80	,8524	74	,91944	—	61,32	156,94	4,38	63,72	,6405
100 + 25	,87337	—	20,72	118,69	2,03	84,25	,8469	100 + 75	,92009	—	62,15	157,73	4,42	63,40	,6373
26	,87472	—	21,55	119,46	2,09	83,71	,8415	76	,92070	—	62,98	158,52	4,46	63,08	,6341
27	,87603	—	22,38	120,23	2,15	83,18	,8361	77	,92133	—	63,81	159,31	4,50	62,77	,6309
28	,87732	—	23,21	120,99	2,22	82,65	,8308	78	,92195	—	64,64	160,11	4,53	62,46	,6278
29	,87859	—	24,04	121,76	2,28	82,13	,8256	79	,92256	—	65,48	160,90	4,58	62,15	,6247
100 + 30	,87984	—	24,87	122,54	2,33	81,61	,8204	100 + 80	,92316	—	66,30	161,70	4,60	61,84	,6217
31	,88107	—	25,69	123,30	2,39	81,10	,8153	81	,92375	—	67,12	162,49	4,63	61,54	,6187
32	,88228	—	26,51	124,07	2,44	80,60	,8102	82	,92434	—	67,95	163,29	4,66	61,24	,6157
33	,88347	—	27,35	124,84	2,51	80,10	,8052	83	,92492	—	68,78	164,08	4,70	60,94	,6127
34	,88464	—	28,18	125,62	2,56	79,61	,8002	84	,92549	—	69,61	164,88	4,73	60,65	,6097
100 + 35	,88580	—	29,01	126,39	2,62	79,12	,7953	100 + 85	,92604	—	70,44	165,67	4,77	60,36	,6067
36	,88693	—	29,83	127,16	2,67	78,64	,7905	86	,92661	—	71,27	166,47	4,80	60,07	,6038
37	,88804	—	30,66	127,93	2,73	78,16	,7857	87	,92716	—	72,10	167,26	4,84	59,79	,6010
38	,88914	—	31,49	128,71	2,78	77,69	,7810	88	,92770	—	72,93	168,06	4,87	59,50	,5982
39	,89022	—	32,32	129,48	2,84	77,22	,7763	89	,92824	—	73,76	168,85	4,91	59,22	,5954
100 + 40	,89128	—	33,15	130,26	2,89	76,76	,7747	100 + 90	,92877	—	74,59	169,64	4,95	58,95	,5925
41	,89234	—	33,98	131,04	2,94	76,31	,7671	91	,92930	—	75,42	170,44	4,98	58,67	,5898
42	,89337	—	34,81	131,81	3,00	75,86	,7626	92	,92982	—	76,25	171,24	5,01	58,40	,5870
43	,89439	—	35,63	132,59	3,04	75,42	,7582	93	,93034	—	77,07	172,04	5,03	58,13	,5843
44	,89540	—	36,46	133,37	3,09	74,98	,7538	94	,93085	—	77,90	172,83	5,07	57,86	,5816
100 + 45	,89638	—	37,29	134,15	3,14	74,54	,7494	100 + 95	,93135	—	78,73	173,63	5,10	57,59	,5789
46	,89737	—	38,12	134,92	3,20	74,11	,7450	96	,93184	—	79,55	174,42	5,13	57,33	,5763
47	,89834	—	38,95	135,70	3,25	73,69	,7408	97	,93233	—	80,37	175,21	5,16	57,07	,5737
48	,89929	—	39,78	136,48	3,30	73,27	,7366	98	,93281	—	81,20	176,00	5,20	56,81	,5711
49	,90023	—	40,60	137,26	3,34	72,85	,7324	99	,93329	—	82,03	176,80	5,23	56,56	,5685

TABLE II. HEAT 51°.

I. Water and Spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93377	100	82,87	177,61	5,26	56,30	,5659
99	,93425	—	83,71	178,43	5,28	56,04	,5633
98	,93474	—	84,57	179,27	5,30	55,78	,5607
97	,93521	—	85,45	180,10	5,35	55,52	,5581
96	,93569	—	86,33	180,95	5,38	55,26	,5555
100 + 95	,93616	—	87,23	181,83	5,40	54,99	,5528
94	,93664	—	88,16	182,73	5,43	54,72	,5502
93	,93713	—	89,11	183,64	5,47	54,45	,5474
92	,93761	—	90,08	184,59	5,49	54,18	,5446
91	,93808	—	91,07	185,55	5,52	53,90	,5418
100 + 90	,93856	—	92,08	186,53	5,55	53,61	,5389
89	,93906	—	93,12	187,54	5,58	53,32	,5360
88	,93956	—	94,18	188,56	5,62	53,03	,5331
87	,94007	—	95,26	189,61	5,65	52,74	,5301
86	,94058	—	96,37	190,69	5,68	52,44	,5271
100 + 85	,94108	—	97,50	191,79	5,71	52,14	,5241
84	,94161	—	98,65	192,92	5,73	51,84	,5211
83	,94214	—	99,84	194,07	5,77	51,53	,5180
82	,94267	—	101,07	195,25	5,82	51,22	,5148
81	,94320	—	102,31	196,47	5,84	50,90	,5116
100 + 80	,94373	—	103,59	197,71	5,88	50,58	,5084
79	,94427	—	104,90	198,99	5,91	50,25	,5052
78	,94481	—	106,25	200,29	5,96	49,92	,5019
77	,94536	—	107,63	201,64	5,99	49,59	,4986
76	,94590	—	109,05	203,03	6,02	49,25	,4952
100 + 75	,94644	—	110,50	204,44	6,06	48,91	,4917
74	,94698	—	111,99	205,91	6,08	48,56	,4882
73	,94754	—	113,52	207,40	6,12	48,21	,4847
72	,94809	—	115,10	208,96	6,14	47,86	,4811
71	,94864	—	116,72	210,54	6,18	47,50	,4774
100 + 70	,94920	—	118,39	212,17	6,22	47,13	,4737
69	,94976	—	120,10	213,85	6,25	46,76	,4700
68	,95034	—	121,87	215,59	6,28	46,38	,4663
67	,95091	—	123,69	217,37	6,32	46,00	,4625
66	,95148	—	125,57	219,21	6,36	45,62	,4586
100 + 65	,95206	—	127,50	221,10	6,40	45,23	,4546
64	,95264	—	129,49	223,07	6,42	44,83	,4506
63	,95322	—	131,54	225,09	6,45	44,43	,4466
62	,95380	—	133,67	227,18	6,49	44,02	,4425
61	,95440	—	135,86	229,34	6,52	43,61	,4383
100 + 60	,95499	—	138,12	231,57	6,55	43,19	,4341
59	,95558	—	140,45	233,87	6,58	42,76	,4298
58	,95619	—	142,88	236,25	6,63	42,32	,4255
57	,95678	—	145,39	238,72	6,67	41,89	,4211
56	,95737	—	147,99	241,30	6,69	41,44	,4166
100 + 55	,95798	—	150,68	243,96	6,72	40,99	,4120
54	,95857	—	153,45	246,72	6,73	40,53	,4075
53	,95916	—	156,33	249,58	6,75	40,06	,4028
52	,95976	—	159,34	252,56	6,78	39,59	,3980
51	,96035	—	162,48	255,66	6,82	39,11	,3932

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,96094	100	165,75	258,89	6,86	38,62	,3883
49	,96154	—	169,14	262,26	6,88	38,13	,3833
48	,96213	—	172,60	265,76	6,90	37,63	,3782
47	,96273	—	176,32	269,41	6,91	37,12	,3731
46	,96331	—	180,16	273,23	6,93	36,60	,3679
100 + 45	,96391	—	184,17	277,23	6,94	36,07	,3626
44	,96449	—	188,36	281,40	6,96	35,53	,3572
43	,96508	—	192,73	285,77	6,96	34,99	,3517
42	,96566	—	197,32	290,37	6,95	34,44	,3462
41	,96624	—	202,13	295,17	6,96	33,88	,3406
100 + 40	,96682	—	207,19	300,22	6,97	33,31	,3348
39	,96739	—	212,50	305,52	6,98	32,73	,3290
38	,96798	—	218,09	311,12	6,97	32,14	,3231
37	,96856	—	223,99	317,02	6,97	31,54	,3170
36	,96914	—	230,21	323,25	6,96	30,93	,3109
100 + 35	,96972	—	236,78	329,84	6,94	30,32	,3047
34	,97029	—	243,75	336,82	6,93	29,69	,2984
33	,97088	—	251,14	344,24	6,90	29,05	,2920
32	,97146	—	258,99	352,12	6,87	28,40	,2855
31	,97204	—	267,34	360,50	6,84	27,74	,2789
100 + 30	,97264	—	276,25	369,46	6,79	27,07	,2721
29	,97323	—	285,78	379,03	6,75	26,38	,2652
28	,97384	—	295,98	389,28	6,70	25,69	,2582
27	,97446	—	306,95	400,30	6,65	24,98	,2511
26	,97508	—	318,75	412,17	6,58	24,26	,2439
100 + 25	,97572	—	331,50	424,97	6,53	23,53	,2366
24	,97635	—	345,32	438,84	6,48	22,78	,2291
23	,97701	—	360,33	453,92	6,41	22,03	,2215
22	,97768	—	376,71	470,38	6,33	21,26	,2137
21	,97836	—	394,65	488,40	6,25	20,47	,2058
100 + 20	,97906	—	414,38	508,22	6,16	19,67	,1978
19	,97977	—	436,19	530,12	6,07	18,86	,1896
18	,98049	—	460,43	554,46	5,97	18,03	,1813
17	,98124	—	487,51	581,65	5,86	17,19	,1728
16	,98202	—	517,98	612,24	5,74	16,33	,1642
100 + 15	,98283	—	552,51	646,89	5,62	15,46	,1554
14	,98366	—	591,98	686,50	5,48	14,57	,1464
13	,98453	—	637,51	732,17	5,34	13,66	,1373
12	,98543	—	690,64	785,44	5,20	12,73	,1280
11	,98638	—	753,42	848,38	5,04	11,79	,1185
100 + 10	,98737	—	828,76	923,87	4,89	10,82	,1088
9	,98839	—	920,86	1016,15	4,71	9,84	,0989
8	,98948	—	1035,96	1131,44	4,52	8,84	,0888
7	,99063	—	1183,96	1279,62	4,34	7,81	,0785
6	,99184	—	1381,28	1477,14	4,14	6,77	,0680
100 + 5	,99310	—	1657,54	1753,61	3,93	5,70	,0573
4	,99443	—	2071,91	2168,21	3,70	4,61	,0464
3	,99586	—	2762,56	2859,06	3,50	3,50	,0352
2	,99737	—	4143,84	4240,54	3,30	2,36	,0237
1	,99896	—	8287,67	8384,55	3,12	1,19	,0120

TABLE I. HEAT 52°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82881	100	—	100,00	—	100,00	1,0046	100 + 50	,90069	100	41,41	138,03	3,38	72,45	,7278
1	,83112	—	0,83	100,72	0,11	99,29	,9975	51	,90160	—	42,24	138,81	3,43	72,04	,7237
2	,83337	—	1,66	101,44	0,22	98,58	,9904	52	,90248	—	43,07	139,59	3,48	71,64	,7197
3	,83558	—	2,49	102,16	0,33	97,88	,9834	53	,90336	—	43,90	140,37	3,53	71,24	,7157
4	,83771	—	3,32	102,89	0,43	97,19	,9764	54	,90421	—	44,73	141,16	3,57	70,84	,7118
100 + 5	,83980	—	4,15	103,63	0,52	96,50	,9695	100 + 55	,90505	—	45,56	141,94	3,62	70,45	,7078
6	,84183	—	4,97	104,36	0,61	95,82	,9627	56	,90588	—	46,38	142,73	3,65	70,06	,7039
7	,84381	—	5,80	105,10	0,70	95,15	,9560	57	,90669	—	47,21	143,51	3,70	69,68	,7001
8	,84574	—	6,63	105,84	0,79	94,48	,9493	58	,90749	—	48,04	144,30	3,74	69,30	,6962
9	,84762	—	7,45	106,58	0,87	93,82	,9427	59	,90828	—	48,87	145,08	3,79	68,92	,6924
100 + 10	,84946	—	8,28	107,33	0,95	93,17	,9361	100 + 60	,90906	—	49,69	145,87	3,82	68,55	,6887
11	,85126	—	9,11	108,08	1,03	92,53	,9296	61	,90982	—	50,52	146,66	3,86	68,18	,6850
12	,85302	—	9,94	108,82	1,12	91,89	,9232	62	,91059	—	51,36	147,45	3,91	67,82	,6814
13	,85474	—	10,77	109,57	1,20	91,26	,9169	63	,91134	—	52,18	148,23	3,95	67,46	,6778
14	,85643	—	11,60	110,33	1,27	90,64	,9106	64	,91206	—	53,01	149,03	3,98	67,10	,6741
100 + 15	,85808	—	12,43	111,08	1,35	90,02	,9044	100 + 65	,91279	—	53,84	149,82	4,02	66,75	,6706
16	,85969	—	13,25	111,83	1,42	89,42	,8983	66	,91352	—	54,67	150,61	4,06	66,40	,6671
17	,86126	—	14,08	112,59	1,49	88,82	,8923	67	,91424	—	55,50	151,39	4,11	66,05	,6636
18	,86280	—	14,91	113,35	1,56	88,22	,8863	68	,91496	—	56,32	152,18	4,14	65,71	,6602
19	,86433	—	15,73	114,11	1,62	87,63	,8804	69	,91566	—	57,15	152,97	4,18	65,37	,6568
100 + 20	,86582	—	16,56	114,87	1,69	87,05	,8746	100 + 70	,91634	—	57,98	153,76	4,22	65,03	,6534
21	,86729	—	17,39	115,63	1,76	86,48	,8688	71	,91703	—	58,81	154,55	4,26	64,70	,6501
22	,86873	—	18,22	116,39	1,83	85,92	,8631	72	,91770	—	59,64	155,34	4,30	64,37	,6468
23	,87015	—	19,05	117,15	1,90	85,36	,8575	73	,91836	—	60,46	156,13	4,33	64,04	,6435
24	,87154	—	19,88	117,92	1,96	84,81	,8520	74	,91901	—	61,29	156,92	4,37	63,73	,6402
100 + 25	,87291	—	20,71	118,69	2,02	84,26	,8465	100 + 75	,91966	—	62,12	157,71	4,41	63,41	,6370
26	,87425	—	21,54	119,45	2,09	83,72	,8410	76	,92028	—	62,95	158,50	4,45	63,09	,6338
27	,87556	—	22,37	120,22	2,15	83,18	,8357	77	,92090	—	63,78	159,29	4,49	62,78	,6306
28	,87685	—	23,20	120,99	2,21	82,65	,8304	78	,92153	—	64,61	160,09	4,52	62,47	,6275
29	,87812	—	24,02	121,76	2,26	82,13	,8252	79	,92214	—	65,44	160,88	4,56	62,16	,6245
100 + 30	,87937	—	24,86	122,53	2,33	81,62	,8199	100 + 80	,92274	—	66,27	161,68	4,59	61,85	,6214
31	,88060	—	25,68	123,30	2,38	81,11	,8148	81	,92333	—	67,09	162,47	4,62	61,55	,6184
32	,88181	—	26,50	124,07	2,43	80,60	,8097	82	,92392	—	67,92	163,27	4,65	61,25	,6154
33	,88300	—	27,33	124,84	2,49	80,10	,8047	83	,92450	—	68,75	164,06	4,69	60,95	,6124
34	,88418	—	28,16	125,61	2,55	79,61	,7998	84	,92507	—	69,57	164,86	4,71	60,66	,6094
100 + 35	,88533	—	28,99	126,39	2,60	79,13	,7949	100 + 85	,92562	—	70,41	165,65	4,76	60,37	,6065
36	,88647	—	29,82	127,16	2,66	78,65	,7901	86	,92619	—	71,24	166,45	4,79	60,08	,6036
37	,88758	—	30,65	127,92	2,73	78,17	,7853	87	,92674	—	72,06	167,24	4,82	59,80	,6007
38	,88868	—	31,48	128,70	2,78	77,70	,7806	88	,92728	—	72,89	168,03	4,86	59,51	,5979
39	,88976	—	32,30	129,47	2,83	77,23	,7759	89	,92782	—	73,72	168,83	4,89	59,23	,5951
100 + 40	,89083	—	33,13	130,25	2,88	76,77	,7713	100 + 90	,92835	—	74,55	169,62	4,93	58,95	,5922
41	,89188	—	33,96	131,03	2,93	76,32	,7667	91	,92887	—	75,38	170,42	4,96	58,68	,5895
42	,89292	—	34,79	131,80	2,99	75,87	,7622	92	,92939	—	76,21	171,22	4,99	58,40	,5867
43	,89394	—	35,61	132,58	3,03	75,42	,7578	93	,92991	—	77,03	172,02	5,01	58,13	,5840
44	,89495	—	36,44	133,36	3,08	74,98	,7534	94	,93042	—	77,86	172,81	5,05	57,86	,5813
100 + 45	,89593	—	37,27	134,14	3,13	74,55	,7490	100 + 95	,93092	—	78,69	173,61	5,08	57,60	,5787
46	,89692	—	38,10	134,91	3,19	74,12	,7446	96	,93141	—	79,51	174,40	5,11	57,34	,5760
47	,89789	—	38,93	135,69	3,24	73,70	,7404	97	,93191	—	80,33	175,19	5,14	57,08	,5734
48	,89884	—	39,76	136,47	3,29	73,28	,7362	98	,93239	—	81,16	175,98	5,18	56,82	,5708
49	,89978	—	40,58	137,25	3,33	72,86	,7320	99	,93287	—	81,99	176,78	5,21	56,56	,5682

TABLE II. HEAT 52°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93334	100	82,83	177,59	5,24	56,30	,5657	100 + 50	,96062	100	165,66	258,83	6,83	38,63	,3881
99	,93383	—	83,67	178,41	5,26	56,05	,5631	49	,96122	—	169,05	262,20	6,85	38,14	,3832
98	,93432	—	84,53	179,24	5,29	55,79	,5605	48	,96182	—	172,57	265,69	6,88	37,63	,3781
97	,93479	—	85,41	180,08	5,33	55,53	,5579	47	,96242	—	176,23	269,34	6,89	37,13	,3730
96	,93528	—	86,29	180,93	5,36	55,27	,5553	46	,96301	—	180,06	273,16	6,90	36,61	,3678
100 + 95	,93575	—	87,19	181,80	5,39	55,00	,5526	100 + 45	,96362	—	184,07	277,16	6,91	36,08	,3625
94	,93623	—	88,12	182,70	5,42	54,73	,5499	44	,96420	—	188,26	281,32	6,94	35,54	,3571
93	,93672	—	89,06	183,62	5,44	54,46	,5471	43	,96479	—	192,63	285,69	6,94	35,00	,3516
92	,93720	—	90,03	184,56	5,47	54,19	,5443	42	,96538	—	197,21	290,28	6,93	34,45	,3461
91	,93768	—	91,02	185,53	5,49	53,91	,5415	41	,96597	—	202,02	295,08	6,94	33,89	,3405
100 + 90	,93816	—	92,03	186,50	5,53	53,62	,5387	100 + 40	,96655	—	207,08	300,12	6,96	33,32	,3347
89	,93866	—	93,07	187,51	5,57	53,33	,5358	39	,96713	—	212,39	305,43	6,96	32,74	,3289
88	,93916	—	94,13	188,53	5,60	53,04	,5329	38	,96772	—	217,97	311,02	6,95	32,15	,3230
87	,93967	—	95,21	189,58	5,63	52,75	,5299	37	,96831	—	223,87	316,93	6,94	31,55	,3169
86	,94018	—	96,32	190,66	5,66	52,45	,5269	36	,96890	—	230,09	323,15	6,94	30,94	,3108
100 + 85	,94068	—	97,45	191,76	5,69	52,15	,5239	100 + 35	,96949	—	236,66	329,73	6,93	30,33	,3047
84	,94121	—	98,60	192,89	5,71	51,85	,5209	34	,97006	—	243,62	336,71	6,91	29,70	,2984
83	,94173	—	99,79	194,04	5,75	51,54	,5178	33	,97065	—	251,01	344,12	6,89	29,06	,2920
82	,94226	—	101,01	195,22	5,79	51,22	,5146	32	,97124	—	258,85	352,00	6,85	28,41	,2855
81	,94280	—	102,26	196,44	5,82	50,91	,5114	31	,97183	—	267,20	360,37	6,83	27,75	,2788
100 + 80	,94333	—	103,54	197,68	5,86	50,59	,5082	100 + 30	,97244	—	276,10	369,32	6,78	27,08	,2720
79	,94387	—	104,85	198,96	5,89	50,26	,5050	29	,97303	—	285,63	378,89	6,74	26,39	,2651
78	,94441	—	106,20	200,26	5,94	49,93	,5017	28	,97364	—	295,82	389,13	6,69	25,70	,2581
77	,94496	—	107,57	201,61	5,96	49,59	,4984	27	,97427	—	306,79	400,14	6,65	24,99	,2510
76	,94550	—	108,99	202,99	6,00	49,26	,4950	26	,97490	—	318,58	412,00	6,58	24,27	,2438
100 + 75	,94604	—	110,44	204,41	6,03	48,92	,4915	100 + 25	,97554	—	331,33	424,80	6,53	23,54	,2365
74	,94659	—	111,93	205,87	6,06	48,57	,4880	24	,97618	—	345,14	438,66	6,48	22,79	,2290
73	,94715	—	113,46	207,37	6,09	48,22	,4845	23	,97684	—	360,14	453,73	6,41	22,04	,2214
72	,94770	—	115,04	208,92	6,12	47,86	,4809	22	,97752	—	376,51	470,18	6,33	21,27	,2136
71	,94825	—	116,66	210,51	6,15	47,50	,4773	21	,97821	—	394,44	488,19	6,25	20,48	,2058
100 + 70	,94881	—	118,33	212,14	6,19	47,14	,4736	100 + 20	,97892	—	414,16	508,00	6,16	19,68	,1978
69	,94938	—	120,04	213,82	6,22	46,76	,4699	19	,97963	—	435,96	529,88	6,08	18,87	,1896
68	,94996	—	121,80	215,55	6,25	46,39	,4661	18	,98036	—	460,19	554,21	5,98	18,04	,1813
67	,95053	—	123,62	217,33	6,29	46,01	,4623	17	,98112	—	487,25	581,38	5,87	17,20	,1728
66	,95110	—	125,50	219,17	6,33	45,62	,4584	16	,98190	—	517,71	611,95	5,76	16,34	,1642
100 + 65	,95169	—	127,43	221,06	6,37	45,23	,4544	100 + 15	,98272	—	552,22	646,58	5,64	15,47	,1554
64	,95227	—	129,42	223,02	6,40	44,83	,4505	14	,98355	—	591,67	686,17	5,50	14,57	,1464
63	,95285	—	131,47	225,04	6,43	44,43	,4464	13	,98443	—	637,18	731,81	5,37	13,66	,1373
62	,95344	—	133,60	227,13	6,47	44,02	,4423	12	,98534	—	690,28	785,06	5,22	12,74	,1280
61	,95404	—	135,79	229,29	6,50	43,61	,4382	11	,98629	—	753,03	847,96	5,07	11,80	,1185
100 + 60	,95463	—	138,05	231,52	6,53	43,19	,4339	100 + 10	,98729	—	828,33	923,41	4,92	10,83	,1088
59	,95523	—	140,38	233,82	6,56	42,77	,4297	9	,98831	—	920,38	1015,64	4,74	9,85	,0989
58	,95584	—	142,80	236,20	6,60	42,33	,4253	8	,98940	—	1035,42	1130,87	4,55	8,84	,0888
57	,95643	—	145,31	238,67	6,64	41,89	,4209	7	,99056	—	1183,34	1278,97	4,37	7,82	,0785
56	,95703	—	147,91	241,24	6,67	41,45	,4164	6	,99177	—	1380,56	1476,38	4,18	6,77	,0680
100 + 55	,95764	—	150,60	243,90	6,70	41,00	,4119	100 + 5	,99304	—	1656,67	1752,70	3,97	5,70	,0573
54	,95823	—	153,37	246,66	6,71	40,54	,4073	4	,99437	—	2070,83	2167,08	3,75	4,61	,0464
53	,95883	—	156,25	249,52	6,73	40,07	,4026	3	,99580	—	2761,11	2857,56	3,55	3,50	,0352
52	,95943	—	159,26	252,50	6,76	39,60	,3979	2	,99731	—	4141,66	4238,31	3,35	2,36	,0237
51	,96002	—	162,39	255,60	6,79	39,12	,3930	1	,99890	—	8283,32	8380,15	3,17	1,19	,0120

TABLE I. HEAT 53°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82833	100	—	100,00	—	100,00	1,0040	100 + 50	,90024	100	41,39	138,02	3,37	72,46	,7275
1	,83063	—	0,83	100,72	0,11	99,29	,9969	51	,90114	—	42,22	138,80	3,42	72,05	,7234
2	,83288	—	1,66	101,44	0,22	98,58	,9898	52	,90203	—	43,05	139,58	3,47	71,64	,7194
3	,83509	—	2,49	102,16	0,33	97,88	,9828	53	,90290	—	43,87	140,36	3,51	71,24	,7154
4	,83723	—	3,32	102,89	0,43	97,19	,9758	54	,90375	—	44,70	141,15	3,55	70,85	,7114
100 + 5	,83932	—	4,14	103,63	0,51	96,50	,9689	100 + 55	,90459	—	45,53	141,93	3,60	70,46	,7074
6	,84135	—	4,97	104,36	0,61	95,82	,9622	56	,90542	—	46,35	142,72	3,63	70,07	,7036
7	,84332	—	5,80	105,10	0,70	95,15	,9555	57	,90623	—	47,18	143,50	3,68	69,68	,6997
8	,84526	—	6,63	105,84	0,79	94,48	,9488	58	,90703	—	48,01	144,29	3,72	69,30	,6958
9	,84714	—	7,45	106,58	0,87	93,82	,9422	59	,90782	—	48,84	145,07	3,77	68,93	,6921
100 + 10	,84898	—	8,28	107,33	0,95	93,17	,9355	100 + 60	,90860	—	49,67	145,86	3,81	68,56	,6883
11	,85078	—	9,11	108,08	1,03	92,53	,9291	61	,90937	—	50,50	146,65	3,85	68,19	,6846
12	,85254	—	9,93	108,82	1,11	91,90	,9227	62	,91013	—	51,33	147,44	3,89	67,82	,6811
13	,85426	—	10,76	109,57	1,19	91,27	,9164	63	,91088	—	52,15	148,22	3,93	67,46	,6775
14	,85595	—	11,59	110,33	1,26	90,65	,9101	64	,91161	—	52,98	149,01	3,97	67,11	,6738
100 + 15	,85760	—	12,42	111,08	1,34	90,03	,9039	100 + 65	,91234	—	53,81	149,80	4,01	66,76	,6702
16	,85921	—	13,25	111,83	1,42	89,42	,8978	66	,91307	—	54,64	150,59	4,05	66,41	,6667
17	,86078	—	14,07	112,59	1,48	88,82	,8918	67	,91379	—	55,47	151,37	4,10	66,06	,6633
18	,86233	—	14,90	113,35	1,55	88,22	,8858	68	,91451	—	56,29	152,16	4,13	65,72	,6599
19	,86386	—	15,72	114,10	1,62	87,63	,8799	69	,91522	—	57,12	152,95	4,17	65,38	,6565
100 + 20	,86535	—	16,56	114,87	1,69	87,05	,8741	100 + 70	,91590	—	57,95	153,74	4,21	65,04	,6531
21	,86682	—	17,39	115,63	1,76	86,48	,8684	71	,91659	—	58,78	154,53	4,25	64,71	,6498
22	,86826	—	18,21	116,39	1,82	85,92	,8627	72	,91726	—	59,61	155,32	4,29	64,38	,6465
23	,86968	—	19,04	117,15	1,89	85,36	,8571	73	,91793	—	60,43	156,11	4,32	64,05	,6432
24	,87107	—	19,87	117,91	1,96	84,81	,8516	74	,91858	—	61,26	156,90	4,36	63,73	,6399
100 + 25	,87244	—	20,70	118,68	2,02	84,26	,8460	100 + 75	,91923	—	62,09	157,69	4,40	63,41	,6367
26	,87378	—	21,52	119,44	2,08	83,72	,8406	76	,91986	—	62,91	158,48	4,43	63,09	,6335
27	,87509	—	22,35	120,21	2,14	83,18	,8352	77	,92048	—	63,75	159,27	4,48	62,78	,6303
28	,87638	—	23,19	120,98	2,21	82,66	,8299	78	,92110	—	64,57	160,08	4,49	62,47	,6272
29	,87765	—	24,01	121,75	2,26	82,13	,8247	79	,92171	—	65,41	160,86	4,55	62,16	,6242
100 + 30	,87890	—	24,84	122,52	2,32	81,62	,8195	100 + 80	,92231	—	66,23	161,66	4,57	61,86	,6211
31	,88013	—	25,67	123,29	2,38	81,11	,8144	81	,92290	—	67,05	162,46	4,59	61,55	,6181
32	,88134	—	26,48	124,06	2,42	80,61	,8093	82	,92349	—	67,88	163,25	4,63	61,25	,6151
33	,88254	—	27,32	124,83	2,49	80,11	,8043	83	,92407	—	68,71	164,04	4,67	60,96	,6121
34	,88371	—	28,15	125,60	2,55	79,62	,7994	84	,92464	—	69,53	164,84	4,69	60,66	,6091
100 + 35	,88486	—	28,98	126,38	2,60	79,13	,7945	100 + 85	,92520	—	70,37	165,63	4,74	60,37	,6062
36	,88600	—	29,80	127,15	2,65	78,65	,7897	86	,92577	—	71,20	166,42	4,78	60,09	,6033
37	,88712	—	30,63	127,92	2,71	78,17	,7849	87	,92633	—	72,02	167,22	4,80	59,81	,6004
38	,88822	—	31,46	128,70	2,76	77,70	,7802	88	,92686	—	72,85	168,01	4,84	59,52	,5976
39	,88930	—	32,28	129,47	2,81	77,23	,7755	89	,92740	—	73,68	168,81	4,87	59,24	,5948
100 + 40	,89037	—	33,12	130,25	2,87	76,78	,7709	100 + 90	,92793	—	74,51	169,60	4,91	58,96	,5920
41	,89142	—	33,95	131,02	2,93	76,32	,7663	91	,92844	—	75,34	170,40	4,94	58,68	,5892
42	,89246	—	34,78	131,79	2,99	75,87	,7618	92	,92897	—	76,17	171,20	4,97	58,41	,5865
43	,89349	—	35,60	132,57	3,03	75,43	,7574	93	,92948	—	76,99	172,00	4,99	58,14	,5838
44	,89450	—	36,43	133,35	3,08	74,99	,7530	94	,92999	—	77,82	172,79	5,03	57,87	,5811
100 + 45	,89548	—	37,26	134,13	3,13	74,55	,7486	100 + 95	,93049	—	78,65	173,59	5,06	57,61	,5784
46	,89647	—	38,08	134,90	3,18	74,13	,7443	96	,93098	—	79,47	174,38	5,09	57,35	,5758
47	,89744	—	38,91	135,68	3,23	73,70	,7400	97	,93148	—	80,29	175,17	5,12	57,09	,5732
48	,89839	—	39,74	136,46	3,28	73,28	,7358	98	,93197	—	81,12	175,96	5,16	56,83	,5706
49	,89933	—	40,56	137,24	3,32	72,86	,7316	99	,93244	—	81,95	176,76	5,19	56,57	,5680

TABLE II. HEAT 55°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93291	100	82,78	177,57	5,21	56,31	,5654	100 + 50	,96030	100	165,57	258,76	6,81	38,64	,3880
99	,93341	—	83,63	178,38	5,25	56,05	,5628	49	,96091	—	168,96	262,14	6,82	38,14	,3831
98	,93390	—	84,49	179,22	5,27	55,79	,5602	48	,96151	—	172,48	265,62	6,86	37,64	,3780
97	,93438	—	85,36	180,06	5,30	55,53	,5576	47	,96211	—	176,14	269,27	6,87	37,14	,3729
96	,93486	—	86,24	180,91	5,33	55,27	,5550	46	,96271	—	179,97	273,08	6,89	36,62	,3677
100 + 95	,93534	—	87,14	181,78	5,36	55,01	,5523	100 + 45	,96332	—	183,97	277,08	6,89	36,09	,3624
94	,93582	—	88,08	182,68	5,40	54,74	,5496	44	,96391	—	188,16	281,24	6,92	35,55	,3570
93	,93631	—	89,01	183,59	5,42	54,47	,5469	43	,96450	—	192,53	285,60	6,93	35,01	,3515
92	,93679	—	89,98	184,53	5,45	54,19	,5441	42	,96510	—	197,11	290,19	6,92	34,46	,3460
91	,93728	—	90,97	185,50	5,47	53,91	,5413	41	,96570	—	201,92	294,99	6,93	33,90	,3404
100 + 90	,93776	—	91,98	186,47	5,51	53,62	,5384	100 + 40	,96628	—	206,97	300,03	6,94	33,33	,3346
89	,93826	—	93,02	187,48	5,54	53,33	,5356	39	,96687	—	212,28	305,34	6,94	32,75	,3288
88	,93876	—	94,08	188,50	5,58	53,05	,5327	38	,96747	—	217,86	310,93	6,93	32,16	,3229
87	,93927	—	95,16	189,55	5,61	52,75	,5297	37	,96806	—	223,75	316,83	6,92	31,56	,3169
86	,93978	—	96,27	190,63	5,64	52,45	,5267	36	,96866	—	229,97	325,05	6,92	30,95	,3108
100 + 85	,94028	—	97,40	191,73	5,67	52,15	,5237	100 + 35	,96925	—	236,54	329,62	6,92	30,34	,3046
84	,94081	—	98,55	192,86	5,69	51,85	,5207	34	,96983	—	243,50	336,59	6,91	29,71	,2983
83	,94133	—	99,74	194,01	5,73	51,55	,5176	33	,97043	—	250,88	344,00	6,88	29,07	,2919
82	,94186	—	100,96	195,19	5,77	51,23	,5144	32	,97102	—	258,71	351,87	6,84	28,42	,2854
81	,94240	—	102,20	196,41	5,79	50,91	,5112	31	,97162	—	267,06	360,24	6,82	27,76	,2788
100 + 80	,94293	—	103,48	197,65	5,83	50,59	,5080	100 + 30	,97223	—	275,96	369,19	6,77	27,09	,2719
79	,94347	—	104,79	198,92	5,87	50,27	,5048	29	,97283	—	285,48	378,75	6,73	26,40	,2651
78	,94401	—	106,14	200,23	5,91	49,94	,5015	28	,97345	—	295,67	388,98	6,69	25,71	,2581
77	,94456	—	107,51	201,58	5,93	49,60	,4982	27	,97408	—	306,63	399,98	6,65	25,00	,2510
76	,94510	—	108,93	202,96	5,97	49,27	,4948	26	,97472	—	318,41	411,83	6,58	24,28	,2438
100 + 75	,94564	—	110,38	204,38	6,00	48,93	,4913	100 + 25	,97536	—	331,16	424,63	6,53	23,55	,2364
74	,94620	—	111,87	205,83	6,04	48,58	,4878	24	,97601	—	344,96	438,48	6,48	22,80	,2290
73	,94676	—	113,40	207,34	6,06	48,23	,4843	23	,97668	—	359,95	453,54	6,41	22,05	,2214
72	,94731	—	114,98	208,89	6,09	47,87	,4807	22	,97736	—	376,31	469,98	6,33	21,28	,2136
71	,94787	—	116,60	210,47	6,13	47,51	,4771	21	,97806	—	394,23	487,98	6,25	20,49	,2057
100 + 70	,94843	—	118,27	212,11	6,16	47,14	,4734	100 + 20	,97877	—	413,94	507,78	6,16	19,69	,1977
69	,94900	—	119,96	213,78	6,20	46,77	,4697	19	,97949	—	435,73	529,65	6,08	18,88	,1895
68	,94958	—	121,74	215,51	6,24	46,40	,4659	18	,98023	—	459,95	553,96	5,99	18,05	,1812
67	,95015	—	123,56	217,29	6,27	46,02	,4621	17	,98100	—	487,00	581,12	5,88	17,21	,1727
66	,95073	—	125,44	219,13	6,31	45,63	,4582	16	,98179	—	517,44	611,66	5,78	16,35	,1641
100 + 65	,95131	—	127,37	221,02	6,35	45,24	,4543	100 + 15	,98261	—	551,93	646,28	5,65	15,48	,1553
64	,95190	—	129,35	222,98	6,37	44,84	,4503	14	,98345	—	591,36	685,84	5,52	14,58	,1463
63	,95249	—	131,40	225,00	6,40	44,44	,4462	13	,98433	—	636,85	731,46	5,39	13,67	,1372
62	,95308	—	133,53	227,09	6,44	44,03	,4421	12	,98525	—	689,92	784,68	5,24	12,74	,1280
61	,95368	—	135,72	229,25	6,47	43,62	,4380	11	,98620	—	752,64	847,54	5,10	11,80	,1185
100 + 60	,95428	—	137,98	231,47	6,51	43,20	,4338	100 + 10	,98720	—	827,90	922,95	4,95	10,84	,1088
59	,95488	—	140,31	233,77	6,54	42,77	,4295	9	,98823	—	919,90	1015,13	4,77	9,85	,0989
58	,95549	—	142,72	236,15	6,57	42,34	,4251	8	,98933	—	1034,88	1130,30	4,58	8,84	,0888
57	,95609	—	145,24	238,62	6,62	41,90	,4207	7	,99049	—	1182,72	1278,32	4,40	7,81	,0786
56	,95669	—	147,83	241,10	6,64	41,46	,4163	6	,99170	—	1379,84	1475,62	4,22	6,78	,0680
100 + 55	,95730	—	150,52	243,85	6,67	41,01	,4117	100 + 5	,99298	—	1655,81	1751,79	4,02	5,71	,0573
54	,95790	—	153,29	246,60	6,69	40,55	,4071	4	,99431	—	2069,75	2165,90	3,79	4,62	,0464
53	,95850	—	156,17	249,46	6,71	40,08	,4025	3	,99574	—	2759,66	2856,06	3,60	3,50	,0352
52	,95910	—	159,18	252,44	6,74	39,61	,3978	2	,99725	—	4139,50	4236,09	3,41	2,36	,0237
51	,95970	—	162,31	255,54	6,77	39,13	,3929	1	,99884	—	8279,00	8375,77	3,23	1,19	,0120

TABLE I. HEAT 54°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,82784	100	—	100,00	—	100,00	1,0034
1	,83015	—	0,83	100,72	0,11	99,29	,9963
2	,83240	—	1,66	101,44	0,22	98,58	,9892
3	,83460	—	2,49	102,16	0,33	97,88	,9822
4	,83674	—	3,31	102,89	0,42	97,19	,9752
100 + 5	,83883	—	4,14	103,63	0,51	96,50	,9683
6	,84086	—	4,96	104,36	0,60	95,82	,9616
7	,84283	—	5,79	105,10	0,69	95,15	,9549
8	,84477	—	6,62	105,84	0,78	94,48	,9482
9	,84666	—	7,45	106,58	0,87	93,83	,9416
100 + 10	,84850	—	8,28	107,32	0,96	93,18	,9350
11	,85030	—	9,11	108,07	1,04	92,54	,9286
12	,85206	—	9,93	108,82	1,11	91,90	,9222
13	,85378	—	10,76	109,57	1,19	91,27	,9159
14	,85547	—	11,59	110,32	1,27	90,65	,9096
100 + 15	,85712	—	12,41	111,08	1,33	90,03	,9034
16	,85873	—	13,24	111,85	1,41	89,42	,8973
17	,86031	—	14,07	112,58	1,49	88,82	,8913
18	,86186	—	14,90	113,34	1,56	88,23	,8853
19	,86339	—	15,71	114,10	1,61	87,64	,8794
100 + 20	,86488	—	16,55	114,86	1,69	87,06	,8736
21	,86635	—	17,38	115,62	1,76	86,49	,8679
22	,86779	—	18,20	116,38	1,82	85,92	,8622
23	,86921	—	19,03	117,14	1,89	85,36	,8566
24	,87060	—	19,86	117,91	1,95	84,81	,8511
100 + 25	,87197	—	20,69	118,68	2,01	84,26	,8455
26	,87331	—	21,51	119,44	2,07	83,72	,8401
27	,87462	—	22,34	120,21	2,13	83,19	,8348
28	,87591	—	23,18	120,98	2,20	82,66	,8295
29	,87718	—	23,99	121,75	2,24	82,14	,8243
100 + 30	,87843	—	24,83	122,52	2,31	81,62	,8190
31	,87966	—	25,65	123,29	2,36	81,11	,8139
32	,88087	—	26,47	124,06	2,41	80,61	,8088
33	,88207	—	27,30	124,83	2,47	80,11	,8039
34	,88324	—	28,14	125,60	2,54	79,62	,7990
100 + 35	,88439	—	28,96	126,37	2,59	79,13	,7941
36	,88554	—	29,79	127,14	2,65	78,65	,7893
37	,88666	—	30,62	127,91	2,71	78,18	,7845
38	,88776	—	31,45	128,69	2,76	77,71	,7798
39	,88884	—	32,26	129,46	2,80	77,24	,7751
100 + 40	,88991	—	33,10	130,24	2,86	76,78	,7705
41	,89097	—	33,93	131,01	2,92	76,33	,7659
42	,89201	—	34,76	131,78	2,98	75,88	,7614
43	,89304	—	35,58	132,56	3,02	75,43	,7570
44	,89405	—	36,41	133,34	3,07	74,99	,7526
100 + 45	,89503	—	37,24	134,12	3,12	74,56	,7482
46	,89602	—	38,06	134,89	3,17	74,13	,7438
47	,89699	—	38,89	135,67	3,22	73,71	,7396
48	,89794	—	39,72	136,45	3,27	73,29	,7354
49	,89887	—	40,54	137,23	3,31	72,87	,7312

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,89978	100	41,37	138,01	3,36	72,46	,7272
51	,90068	—	42,20	138,79	3,41	72,05	,7230
52	,90157	—	43,03	139,57	3,46	71,65	,7190
53	,90244	—	43,85	140,35	3,50	71,25	,7150
54	,90329	—	44,68	141,14	3,54	70,85	,7110
100 + 55	,90413	—	45,51	141,92	3,59	70,46	,7071
56	,90496	—	46,33	142,71	3,62	70,07	,7032
57	,90577	—	47,16	143,49	3,67	69,69	,6993
58	,90657	—	47,99	144,28	3,71	69,31	,6955
59	,90736	—	48,81	145,06	3,75	68,93	,6917
100 + 60	,90814	—	49,64	145,85	3,79	68,56	,6880
61	,90891	—	50,47	146,64	3,83	68,20	,6843
62	,90967	—	51,30	147,43	3,87	67,83	,6807
63	,91042	—	52,12	148,21	3,91	67,47	,6771
64	,91115	—	52,95	149,00	3,95	67,11	,6734
100 + 65	,91189	—	53,78	149,79	3,99	66,76	,6699
66	,91262	—	54,61	150,58	4,03	66,41	,6664
67	,91334	—	55,44	151,36	4,08	66,06	,6630
68	,91406	—	56,26	152,15	4,11	65,72	,6596
69	,91477	—	57,09	152,94	4,15	65,38	,6562
100 + 70	,91546	—	57,92	153,73	4,19	65,05	,6528
71	,91615	—	58,75	154,52	4,23	64,72	,6495
72	,91682	—	59,58	155,31	4,27	64,39	,6462
73	,91750	—	60,40	156,09	4,31	64,06	,6429
74	,91815	—	61,23	156,88	4,35	63,74	,6396
100 + 75	,91880	—	62,06	157,68	4,38	63,42	,6364
76	,91944	—	62,88	158,47	4,41	63,10	,6332
77	,92006	—	63,71	159,25	4,46	62,79	,6300
78	,92067	—	64,54	160,06	4,48	62,48	,6269
79	,92128	—	65,37	160,84	4,53	62,17	,6239
100 + 80	,92189	—	66,20	161,64	4,56	61,86	,6208
81	,92247	—	67,02	162,44	4,58	61,56	,6178
82	,92307	—	67,85	163,23	4,62	61,26	,6148
83	,92365	—	68,67	164,02	4,65	60,96	,6118
84	,92421	—	69,50	164,82	4,68	60,67	,6088
100 + 85	,92478	—	70,33	165,61	4,72	60,38	,6059
86	,92535	—	71,17	166,40	4,77	60,09	,6030
87	,92590	—	71,98	167,20	4,78	59,81	,6001
88	,92644	—	72,81	167,99	4,82	59,52	,5973
89	,92797	—	73,64	168,79	4,85	59,24	,5945
100 + 90	,92751	—	74,47	169,58	4,89	58,96	,5917
91	,92802	—	75,30	170,38	4,92	58,69	,5889
92	,92854	—	76,13	171,18	4,95	58,42	,5862
93	,92905	—	76,95	171,98	4,97	58,15	,5835
94	,92956	—	77,78	172,77	5,01	57,88	,5808
100 + 95	,93006	—	78,61	173,57	5,04	57,61	,5781
96	,93055	—	79,43	174,36	5,07	57,35	,5755
97	,93105	—	80,25	175,15	5,10	57,09	,5729
98	,93154	—	81,08	175,94	5,14	56,83	,5703
99	,93202	—	81,91	176,74	5,17	56,58	,5677

TABLE II. HEAT 54°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93249	100	82,74	177,55	5,19	56,32	,5652
99	,93299	—	83,59	178,36	5,23	56,06	,5626
98	,93348	—	84,44	179,19	5,25	55,80	,5600
97	,93396	—	85,32	180,04	5,28	55,54	,5574
96	,93445	—	86,20	180,89	5,31	55,28	,5548
100 + 95	,93493	—	87,10	181,76	5,34	55,02	,5521
94	,93541	—	88,03	182,66	5,37	54,75	,5494
93	,93590	—	88,96	183,57	5,39	54,47	,5466
92	,93639	—	89,93	184,50	5,43	54,20	,5439
91	,93688	—	90,92	185,47	5,45	53,92	,5410
100 + 90	,93736	—	91,93	186,44	5,49	53,63	,5382
89	,93786	—	92,97	187,45	5,52	53,34	,5353
88	,93836	—	94,03	188,47	5,56	53,05	,5324
87	,93887	—	95,11	189,52	5,59	52,76	,5295
86	,93938	—	96,22	190,60	5,62	52,46	,5265
100 + 85	,93988	—	97,35	191,70	5,65	52,10	,5235
84	,94041	—	98,50	192,83	5,67	51,86	,5205
83	,94092	—	99,69	193,98	5,71	51,55	,5174
82	,94146	—	100,91	195,16	5,75	51,24	,5142
81	,94200	—	102 15	196,38	5,77	50,92	,5110
100 + 80	,94253	—	103,43	197,62	5,81	50,60	,5078
79	,94307	—	104,74	198,89	5,85	50,28	,5046
78	,94361	—	106,08	200,20	5,88	49,95	,5013
77	,94416	—	107,46	201,55	5,91	49,61	,4980
76	,94471	—	108,87	202 93	5,94	49,28	,4946
100 + 75	,94525	—	110,32	204,35	5,97	48,93	,4910
74	,94581	—	111,81	205,80	6,01	48,59	,4876
73	,94637	—	113,34	207,30	6,04	48,24	,4841
72	,94693	—	114,92	208,85	6,07	47,88	,4805
71	,94749	—	116,54	210,44	6,10	47,52	,4769
100 + 70	,94805	—	118,21	212,07	6,14	47,15	,4732
69	,94862	—	119,92	213,74	6,18	46,78	,4695
68	,94920	—	121,68	215,47	6,21	46,41	,4657
67	,94978	—	123,50	217,25	6,25	46,03	,4619
66	,95036	—	125,37	219,09	6,28	45,64	,4580
100 + 65	,95094	—	127,31	220,98	6,33	45,25	,4541
64	,95153	—	129,28	222,94	6,34	44,85	,4501
63	,95213	—	131,33	224,95	6,38	44,45	,4461
62	,95272	—	133,46	227,04	6,42	44,04	,4420
61	,95332	—	135,65	229,20	6,45	43,63	,4378
100 + 60	,95393	—	137,91	231,42	6,49	43,21	,4336
59	,95453	—	140,24	233,72	6,52	42,78	,4293
58	,95514	—	142,65	236,10	6,55	42,35	,4250
57	,95575	—	145,16	238,57	6,59	41,91	,4206
56	,95635	—	147,76	241,14	6,62	41,47	,4162
100 + 55	,95696	—	150,44	243,80	6,64	41,02	,4116
54	,95757	—	153,21	246,54	6,67	40,56	,4070
53	,95817	—	156,09	249,40	6,69	40,09	,4024
52	,95877	—	159,10	252,38	6,72	39,62	,3977
51	,95938	—	162,23	255,48	6,75	39,14	,3928

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95998	100	165,49	258,70	6,79	38,65	,3879
49	,96059	—	168,87	262,08	6,79	38,15	,3830
48	,96120	—	172,39	265,55	6,84	37,65	,3779
47	,96181	—	176,05	269,20	6,85	37,15	,3728
46	,96241	—	179,88	273,01	6,87	36,63	,3676
100 + 45	,96302	—	183,88	277,00	6,88	36,10	,3623
44	,96362	—	188,06	281,16	6,90	35,56	,3569
43	,96422	—	192,43	285,52	6,91	35,02	,3514
42	,96482	—	197,01	290,10	6,91	34,47	,3459
41	,96543	—	201,82	294,90	6,92	33,91	,3403
100 + 40	,96601	—	206,86	299,94	6,92	33,34	,3345
39	,96661	—	212,17	305,25	6,92	32,76	,3287
38	,96722	—	217,75	310,83	6,92	32,17	,3228
37	,96781	—	223,64	316,74	6,90	31,57	,3168
36	,96842	—	229,85	322,95	6,90	30,96	,3107
100 + 35	,96901	—	236,42	329,51	6,91	30,35	,3045
34	,96960	—	243,37	336,48	6,89	29,72	,2982
33	,97021	—	250,75	343,89	6,86	29,08	,2918
32	,97081	—	258,58	351,75	6,83	28,43	,2853
31	,97141	—	266,92	360,11	6,81	27,77	,2787
100 + 30	,97202	—	275,82	369,05	6,77	27,10	,2719
29	,97263	—	285,33	378,60	6,73	26,41	,2650
28	,97326	—	295,52	388,83	6,69	25,72	,2581
27	,97389	—	306,47	399,82	6,65	25,01	,2509
26	,97454	—	318,25	411,66	6,59	24,29	,2437
100 + 25	,97518	—	330,99	424,46	6,53	23,56	,2364
24	,97584	—	344,78	438,30	6,48	22,81	,2289
23	,97652	—	359,76	453,36	6,40	22,06	,2213
22	,97720	—	376,11	469,78	6,33	21,29	,2135
21	,97791	—	394,03	487,77	6,26	20,50	,2057
100 + 20	,97862	—	413,73	507,56	6,17	19,70	,1977
19	,97935	—	435,51	529,42	6,09	18,89	,1895
18	,98010	—	459,71	553,71	6,00	18,06	,1812
17	,98088	—	486,75	580,86	5,89	17,22	,1727
16	,98168	—	517,17	611,38	5,79	16,36	,1641
100 + 15	,98250	—	551,64	645,98	5,66	15,48	,1553
14	,98335	—	591,05	685,51	5,54	14,59	,1463
13	,98423	—	636,52	731,11	5,41	13,68	,1372
12	,98516	—	689,56	784,30	5,26	12,75	,1279
11	,98611	—	752,25	847,13	5,12	11,81	,1184
100 + 10	,98711	—	827,47	922,49	4,98	10,84	,1088
9	,98815	—	919,42	1014,62	4,80	9,86	,0989
8	,98926	—	1034,34	1129,73	4,61	8,85	,0888
7	,99042	—	1182,10	1277,67	4,43	7,83	,0785
6	,99163	—	1379,12	1474,86	4,20	6,78	,0680
100 + 5	,99291	—	1654,95	1750,89	4,06	5,71	,0573
4	,99425	—	2068,67	2164,83	3,84	4,62	,0463
3	,99568	—	2758,23	2854,58	3,65	3,50	,0351
2	,99719	—	4137,35	4233,89	3,46	2,36	,0237
1	,99878	—	8274,71	8371,43	3,28	1,19	,0120

TABLE I. HEAT 55°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of Bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82736	100	—	100,00	—	100,00	1,0029	100 + 50	,89933	100	41,35	138,00	3,35	72,47	,7267
1	,82967	—	0,83	100,72	0,11	99,29	,9957	51	,90023	—	42,18	138,78	3,40	72,06	,7226
2	,83192	—	1,65	101,44	0,21	98,58	,9886	52	,90111	—	43,01	139,56	3,45	71,65	,7186
3	,83412	—	2,48	102,16	0,32	97,88	,9816	53	,90198	—	43,83	140,34	3,49	71,25	,7146
4	,83626	—	3,31	102,89	0,42	97,19	,9747	54	,90283	—	44,66	141,13	3,53	70,86	,7106
100 + 5	,83834	—	4,13	103,62	0,51	96,50	,9678	100 + 55	,90367	—	45,49	141,91	3,58	70,47	,7067
6	,84037	—	4,96	104,36	0,60	95,82	,9610	56	,90450	—	46,31	142,70	3,61	70,08	,7028
7	,84235	—	5,79	105,10	0,69	95,15	,9543	57	,90531	—	47,14	143,48	3,66	69,69	,6989
8	,84429	—	6,62	105,84	0,78	94,49	,9476	58	,90611	—	47,97	144,27	3,70	69,31	,6951
9	,84618	—	7,44	106,58	0,86	93,83	,9410	59	,90690	—	48,79	145,05	3,74	68,94	,6913
100 + 10	,84802	—	8,27	107,32	0,95	93,18	,9345	100 + 60	,90768	—	49,62	145,84	3,78	68,57	,6876
11	,84982	—	9,10	108,07	1,03	92,54	,9280	61	,90845	—	50,45	146,63	3,82	68,20	,6839
12	,85158	—	9,92	108,81	1,11	91,90	,9216	62	,90921	—	51,28	147,42	3,86	67,83	,6803
13	,85330	—	10,75	109,56	1,19	91,27	,9153	63	,90996	—	52,10	148,20	3,90	67,48	,6767
14	,85499	—	11,58	110,32	1,26	90,65	,9091	64	,91070	—	52,93	148,99	3,94	67,12	,6731
100 + 15	,85664	—	12,41	111,07	1,34	90,03	,9029	100 + 65	,91144	—	53,76	149,78	3,98	66,77	,6696
16	,85825	—	13,23	111,82	1,41	89,43	,8968	66	,91217	—	54,58	150,57	4,01	66,42	,6661
17	,85984	—	14,06	112,58	1,48	88,83	,8908	67	,91289	—	55,41	151,35	4,06	66,07	,6626
18	,86139	—	14,89	113,34	1,55	88,23	,8848	68	,91361	—	56,24	152,14	4,10	65,73	,6592
19	,86292	—	15,71	114,09	1,62	87,64	,8789	69	,91432	—	57,07	152,93	4,14	65,39	,6558
100 + 20	,86441	—	16,54	114,86	1,68	87,06	,8731	100 + 70	,91502	—	57,89	153,71	4,18	65,06	,6524
21	,86588	—	17,37	115,62	1,75	86,49	,8674	71	,91571	—	58,72	154,50	4,22	64,73	,6491
22	,86732	—	18,19	116,38	1,81	85,93	,8617	72	,91639	—	59,55	155,29	4,26	64,40	,6458
23	,86874	—	19,02	117,14	1,88	85,37	,8561	73	,91706	—	60,37	156,08	4,29	64,07	,6425
24	,87013	—	19,85	117,90	1,95	84,82	,8506	74	,91772	—	61,20	156,87	4,33	63,75	,6393
100 + 25	,87150	—	20,68	118,67	2,01	84,27	,8451	100 + 75	,91837	—	62,03	157,66	4,37	63,43	,6361
26	,87284	—	21,50	119,43	2,07	83,73	,8397	76	,91901	—	62,85	158,45	4,40	63,11	,6329
27	,87415	—	22,33	120,20	2,13	83,19	,8343	77	,91963	—	63,68	159,24	4,44	62,80	,6298
28	,87544	—	23,16	120,97	2,19	82,66	,8290	78	,92024	—	64,51	160,04	4,47	62,49	,6267
29	,87671	—	23,98	121,74	2,24	82,14	,8238	79	,92085	—	65,34	160,83	4,51	62,18	,6236
100 + 30	,87796	—	24,81	122,51	2,30	81,63	,8186	100 + 80	,92145	—	66,16	161,62	4,54	61,87	,6205
31	,87919	—	25,64	123,28	2,36	81,12	,8135	81	,92205	—	66,99	162,42	4,57	61,57	,6175
32	,88040	—	26,46	124,05	2,41	80,62	,8084	82	,92264	—	67,82	163,21	4,61	61,27	,6145
33	,88160	—	27,29	124,82	2,47	80,12	,8034	83	,92322	—	68,64	164,00	4,64	60,97	,6115
34	,88277	—	28,12	125,59	2,53	79,63	,7985	84	,92379	—	69,47	164,79	4,68	60,68	,6085
100 + 35	,88393	—	28,95	126,36	2,59	79,14	,7936	100 + 85	,92436	—	70,30	165,59	4,71	60,39	,6056
36	,88507	—	29,77	127,13	2,64	78,66	,7888	86	,92492	—	71,13	166,38	4,75	60,10	,6027
37	,88619	—	30,60	127,90	2,70	78,18	,7840	87	,92547	—	71,95	167,18	4,77	59,82	,5998
38	,88729	—	31,43	128,68	2,75	77,71	,7793	88	,92601	—	72,78	167,97	4,81	59,53	,5970
39	,88838	—	32,25	129,45	2,80	77,25	,7747	89	,92654	—	73,61	168,77	4,84	59,25	,5942
100 + 40	,88945	—	33,08	130,23	2,85	76,79	,7701	100 + 90	,92707	—	74,43	169,56	4,87	58,97	,5914
41	,89051	—	33,91	131,00	2,91	76,33	,7655	91	,92759	—	75,26	170,36	4,90	58,70	,5886
42	,89155	—	34,74	131,77	2,97	75,88	,7610	92	,92811	—	76,09	171,16	4,93	58,43	,5859
43	,89258	—	35,56	132,55	3,01	75,44	,7566	93	,92862	—	76,91	171,96	4,95	58,16	,5832
44	,89359	—	36,39	133,33	3,06	75,00	,7522	94	,92913	—	77,74	172,75	4,99	57,89	,5805
100 + 45	,89458	—	37,22	134,11	3,11	74,57	,7478	100 + 95	,92963	—	78,57	173,55	5,02	57,62	,5779
46	,89556	—	38,04	134,88	3,16	74,14	,7435	96	,93012	—	79,39	174,34	5,05	57,36	,5752
47	,89653	—	38,87	135,66	3,21	73,71	,7392	97	,93062	—	80,21	175,13	5,08	57,10	,5727
48	,89748	—	39,70	136,44	3,26	73,29	,7350	98	,93111	—	81,04	175,92	5,12	56,84	,5701
49	,89841	—	40,52	137,22	3,30	72,88	,7308	99	,93159	—	81,87	176,72	5,15	56,59	,5675

TABLE II. HEAT 55°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93208	100	82,70	177,53	5,17	56,33	,5649	100 + 50	,95966	100	165,41	258,64	6,77	38,66	,3877
99	,93257	—	83,55	178,34	5,21	56,07	,5623	49	,96027	—	168,79	262,03	6,76	38,16	,3828
98	,93306	—	84,40	179,17	5,23	55,81	,5597	48	,96088	—	172,30	265,49	6,81	37,66	,3777
97	,93354	—	85,27	180,02	5,25	55,55	,5571	47	,96150	—	175,96	269,13	6,83	37,16	,3726
96	,93403	—	86,16	180,87	5,29	55,29	,5545	46	,96211	—	179,79	272,94	6,85	36,64	,3674
100 + 95	,93452	—	87,06	181,74	5,32	55,03	,5518	100 + 45	,96272	—	183,79	276,92	6,87	36,11	,3622
94	,93500	—	87,98	182,64	5,34	54,76	,5491	44	,96333	—	187,96	281,08	6,88	35,58	,3568
93	,93549	—	88,92	183,55	5,37	54,48	,5464	43	,96393	—	192,33	285,44	6,89	35,03	,3513
92	,93598	—	89,89	184,48	5,41	54,21	,5436	42	,96454	—	196,91	290,01	6,90	34,48	,3458
91	,93647	—	90,88	185,44	5,44	53,93	,5408	41	,96515	—	201,72	294,80	6,92	33,92	,3402
100 + 90	,93696	—	91,89	186,42	5,47	53,64	,5380	100 + 40	,96575	—	206,76	299,85	6,91	33,35	,3345
89	,93746	—	92,92	187,42	5,50	53,35	,5351	39	,96635	—	212,06	305,16	6,90	32,77	,3286
88	,93796	—	93,98	188,44	5,54	53,06	,5322	38	,96696	—	217,64	310,74	6,90	32,18	,3227
87	,93846	—	95,06	189,49	5,57	52,77	,5292	37	,96756	—	223,53	316,64	6,89	31,58	,3167
86	,93897	—	96,17	190,57	5,60	52,47	,5262	36	,96817	—	229,73	322,86	6,87	30,97	,3106
100 + 85	,93948	—	97,30	191,67	5,63	52,17	,5232	100 + 35	,96877	—	236,30	329,41	6,89	30,36	,3044
84	,94000	—	98,45	192,80	5,65	51,87	,5202	34	,96937	—	243,25	336,37	6,88	29,73	,2981
83	,94052	—	99,64	193,95	5,69	51,56	,5171	33	,96998	—	250,62	343,77	6,85	29,09	,2917
82	,94105	—	100,86	195,13	5,73	51,25	,5139	32	,97059	—	258,45	351,63	6,82	28,44	,2852
81	,94159	—	102,10	196,35	5,75	50,93	,5107	31	,97120	—	266,79	359,98	6,81	27,78	,2786
100 + 80	,94213	—	103,38	197,59	5,79	50,61	,5075	100 + 30	,97181	—	275,68	368,92	6,76	27,11	,2718
79	,94267	—	104,69	198,86	5,83	50,29	,5043	29	,97243	—	285,19	378,46	6,73	26,42	,2650
78	,94321	—	106,03	200,17	5,86	49,96	,5010	28	,97306	—	295,37	388,68	6,69	25,73	,2580
77	,94376	—	107,41	201,52	5,89	49,62	,4977	27	,97370	—	306,41	399,66	6,65	25,02	,2509
76	,94431	—	108,82	202,90	5,92	49,29	,4943	26	,97435	—	318,09	411,49	6,60	24,30	,2437
100 + 75	,94486	—	110,27	204,32	5,95	48,94	,4908	100 + 25	,97500	—	330,82	424,29	6,53	23,57	,2364
74	,94542	—	111,76	205,77	5,99	48,60	,4874	24	,97567	—	344,60	438,13	6,47	22,82	,2289
73	,94598	—	113,29	207,27	6,02	48,25	,4839	23	,97635	—	359,58	453,18	6,40	22,06	,2213
72	,94654	—	114,86	208,81	6,05	47,89	,4803	22	,97704	—	375,92	469,59	6,33	21,29	,2135
71	,94710	—	116,48	210,40	6,08	47,53	,4767	21	,97775	—	393,83	487,57	6,26	20,51	,2057
100 + 70	,94767	—	118,15	212,03	6,12	47,16	,4730	100 + 20	,97847	—	413,52	507,34	6,18	19,71	,1977
69	,94824	—	119,86	213,70	6,16	46,79	,4693	19	,97921	—	435,29	529,19	6,10	18,90	,1895
68	,94882	—	121,62	215,43	6,19	46,42	,4655	18	,97997	—	459,47	553,47	6,00	18,07	,1812
67	,94940	—	123,44	217,21	6,23	46,04	,4617	17	,98075	—	486,50	580,60	5,90	17,22	,1727
66	,94998	—	125,31	219,05	6,26	45,65	,4578	16	,98156	—	516,90	611,10	5,80	16,36	,1641
100 + 65	,95057	—	127,24	220,94	6,30	45,26	,4539	100 + 15	,98239	—	551,36	645,68	5,68	15,49	,1553
64	,95116	—	129,22	222,89	6,33	44,86	,4499	14	,98324	—	590,75	685,19	5,56	14,59	,1463
63	,95176	—	131,27	224,90	6,37	44,46	,4459	13	,98413	—	636,19	730,76	5,43	13,68	,1372
62	,95236	—	133,39	226,99	6,40	44,05	,4418	12	,98506	—	689,20	783,92	5,28	12,75	,1279
61	,95296	—	135,58	229,15	6,43	43,64	,4376	11	,98602	—	751,86	846,72	5,14	11,81	,1184
100 + 60	,95357	—	137,84	231,37	6,47	43,22	,4334	100 + 10	,98702	—	827,04	922,04	5,00	10,85	,1088
59	,95418	—	140,17	233,67	6,50	42,79	,4292	9	,98807	—	918,94	1014,12	4,82	9,86	,0989
58	,95479	—	142,58	236,05	6,53	42,36	,4249	8	,98918	—	1033,80	1129,16	4,64	8,85	,0888
57	,95540	—	145,09	238,52	6,57	41,92	,4205	7	,99034	—	1181,49	1277,02	4,47	7,83	,0785
56	,95601	—	147,69	241,09	6,60	41,48	,4160	6	,99156	—	1378,41	1474,11	4,30	6,78	,0680
100 + 55	,95662	—	150,37	243,74	6,63	41,03	,4114	100 + 5	,99284	—	1654,09	1749,99	4,10	5,71	,0573
54	,95723	—	153,13	246,48	6,65	40,57	,4068	4	,99419	—	2067,61	2163,71	3,90	4,62	,0463
53	,95784	—	156,01	249,34	6,67	40,10	,4022	3	,99562	—	2756,81	2853,11	3,70	3,50	,0351
52	,95844	—	159,02	252,32	6,70	39,63	,3975	2	,99712	—	4135,22	4231,71	3,51	2,36	,0237
51	,95905	—	162,15	255,42	6,73	39,15	,3926	1	,99871	—	8270,45	8367,12	3,33	1,19	,0120

TABLE I. HEAT 56°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82689	100	—	100,00	—	100,00	1,0023	100 + 50	,89887	100	41,33	137,99	3,34	72,47	,7264
1	,82919	—	0,83	100,72	0,11	99,29	,9952	51	,89978	—	42,16	138,77	3,39	72,06	,7223
2	,83145	—	1,65	101,44	0,21	98,58	,9881	52	,90066	—	42,98	139,55	3,43	71,66	,7183
3	,83365	—	2,48	102,16	0,32	97,88	,9811	53	,90153	—	43,80	140,33	3,47	71,26	,7143
4	,83579	—	3,31	102,89	0,42	97,19	,9741	54	,90238	—	44,63	141,11	3,52	70,87	,7103
100 + 5	,83787	—	4,13	103,62	0,51	96,50	,9672	100 + 55	,90323	—	45,46	141,90	3,56	70,47	,7064
6	,83990	—	4,96	104,36	0,60	95,82	,9605	56	,90405	—	46,28	142,68	3,60	70,09	,7025
7	,84188	—	5,79	105,10	0,69	95,15	,9538	57	,90487	—	47,11	143,46	3,65	69,70	,6986
8	,84382	—	6,62	105,84	0,78	94,49	,9471	58	,90567	—	47,94	144,25	3,69	69,32	,6948
9	,84571	—	7,44	106,58	0,86	93,83	,9405	59	,90646	—	48,76	145,03	3,73	68,95	,6910
100 + 10	,84756	—	8,27	107,32	0,95	93,18	,9339	100 + 60	,90724	—	49,59	145,82	3,77	68,58	,6873
11	,84935	—	9,10	108,07	1,03	92,54	,9275	61	,90801	—	50,42	146,61	3,81	68,21	,6836
12	,85111	—	9,92	108,81	1,11	91,90	,9211	62	,90877	—	51,25	147,40	3,85	67,84	,6800
13	,85283	—	10,74	109,56	1,18	91,27	,9148	63	,90953	—	52,07	148,18	3,89	67,48	,6764
14	,85452	—	11,57	110,32	1,25	90,65	,9086	64	,91026	—	52,90	148,97	3,93	67,13	,6728
100 + 15	,85618	—	12,40	111,07	1,33	90,04	,9024	100 + 65	,9110	—	53,73	149,76	3,97	66,77	,6693
16	,85778	—	13,23	111,82	1,41	89,43	,8963	66	,91173	—	54,55	150,55	4,00	66,42	,6658
17	,85938	—	14,05	112,58	1,47	88,83	,8903	67	,91246	—	55,38	151,33	4,05	66,07	,6623
18	,86092	—	14,88	113,33	1,55	88,23	,8844	68	,91318	—	56,21	152,12	4,09	65,73	,6589
19	,86246	—	15,70	114,09	1,61	87,64	,8785	69	,91389	—	57,04	152,91	4,13	65,40	,6555
100 + 20	,86395	—	16,53	114,86	1,67	87,06	,8727	100 + 70	,91459	—	57,86	153,70	4,16	65,06	,6521
21	,86542	—	17,36	115,62	1,74	86,49	,8670	71	,91528	—	58,69	154,48	4,21	64,73	,6488
22	,86686	—	18,19	116,38	1,81	85,93	,8613	72	,91596	—	59,52	155,27	4,25	64,40	,6455
23	,86828	—	19,01	117,14	1,87	85,37	,8557	73	,91663	—	60,34	156,06	4,28	64,07	,6422
24	,86967	—	19,84	117,90	1,94	84,82	,8502	74	,91729	—	61,17	156,85	4,32	63,75	,6390
100 + 25	,87104	—	20,67	118,66	2,01	84,27	,8447	100 + 75	,91794	—	62,00	157,64	4,36	63,43	,6358
26	,87238	—	21,49	119,43	2,06	83,73	,8393	76	,91858	—	62,82	158,43	4,39	63,12	,6326
27	,87369	—	22,32	120,20	2,12	83,19	,8339	77	,91920	—	63,64	159,22	4,42	62,80	,6295
28	,87498	—	23,15	120,96	2,19	82,67	,8286	78	,91982	—	64,47	160,02	4,45	62,49	,6264
29	,87626	—	23,97	121,74	2,23	82,15	,8234	79	,92043	—	65,30	160,81	4,49	62,18	,6233
100 + 30	,87750	—	24,80	122,50	2,30	81,63	,8182	100 + 80	,92102	—	66,12	161,60	4,52	61,88	,6202
31	,87874	—	25,63	123,27	2,36	81,12	,8131	81	,92163	—	66,95	162,40	4,55	61,58	,6172
32	,87994	—	26,45	124,04	2,41	80,62	,8080	82	,92222	—	67,78	163,19	4,59	61,28	,6142
33	,88115	—	27,28	124,81	2,47	80,12	,8030	83	,92280	—	68,60	163,98	4,62	60,98	,6112
34	,88232	—	28,11	125,58	2,53	79,63	,7981	84	,92337	—	69,43	164,77	4,66	60,69	,6083
100 + 35	,88348	—	28,93	126,35	2,58	79,14	,7932	100 + 85	,92393	—	70,26	165,57	4,69	60,40	,6054
36	,88462	—	29,76	127,12	2,64	78,66	,7884	86	,92450	—	71,09	166,36	4,73	60,11	,6025
37	,88574	—	30,58	127,89	2,69	78,19	,7836	87	,92505	—	71,91	167,16	4,75	59,82	,5996
38	,88685	—	31,41	128,67	2,74	77,72	,7789	88	,92559	—	72,74	167,95	4,79	59,54	,5968
39	,88793	—	32,23	129,44	2,79	77,25	,7743	89	,92612	—	73,57	168,75	4,82	59,26	,5940
100 + 40	,88900	—	33,06	130,22	2,84	76,79	,7697	100 + 90	,92666	—	74,39	169,54	4,85	58,98	,5912
41	,89006	—	33,89	130,99	2,90	76,34	,7652	91	,92717	—	75,22	170,33	4,89	58,70	,5884
42	,89110	—	34,72	131,76	2,96	75,89	,7607	92	,92769	—	76,05	171,13	4,92	58,43	,5857
43	,89213	—	35,54	132,54	3,00	75,44	,7563	93	,92821	—	76,87	171,93	4,94	58,16	,5830
44	,89314	—	36,37	133,32	3,05	75,00	,7519	94	,92871	—	77,70	172,73	4,97	57,89	,5803
100 + 45	,89412	—	37,20	134,10	3,10	74,57	,7475	100 + 95	,92922	—	78,53	173,52	5,01	57,63	,5776
46	,89510	—	38,02	134,87	3,15	74,14	,7432	96	,92971	—	79,35	174,31	5,04	57,37	,5750
47	,89608	—	38,85	135,65	3,20	73,72	,7389	97	,93020	—	80,17	175,11	5,06	57,11	,5724
48	,89703	—	39,68	136,43	3,25	73,30	,7347	98	,93069	—	81,00	175,90	5,10	56,85	,5698
49	,89796	—	40,50	137,21	3,29	72,88	,7305	99	,93118	—	81,83	176,70	5,13	56,59	,5672

TABLE II. HEAT 56°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W + Sp.							
100 + 100	,93166	100	82,66	177,50	5,16	56.33	,5646	100 + 50	,95933	100	165,32	258,58	6,74	38,67	,3876
99	,93215	—	83,50	178,31	5,19	56,08	,5621	49	,95995	—	168,70	261,96	6,74	38,17	,3827
98	,93265	—	84,35	179,14	5,21	55.82	,5595	48	,96057	—	172,21	265,42	6,79	37,67	,3776
97	,93313	—	85,22	179,99	5,23	55.56	,5569	47	,96119	—	175,87	269,06	6,81	37,17	,3725
96	,93362	—	86.11	180,84	5,27	55.30	,5543	46	,96181	—	179.70	272,87	6,83	36,65	,3673
100 + 95	,93411	—	87,01	181,71	5,30	55,03	,5516	100 + 45	,96242	—	183,70	276,85	6,85	36,12	,3620
94	,93460	—	87,93	182,62	5,31	54,76	,5489	44	,96304	—	187,86	281,00	6,86	35,59	,3567
93	,93509	—	88,87	183.52	5,35	54.49	,5462	43	,96364	—	192,23	285,36	6,87	35,04	,3512
92	,93558	—	89,84	184,45	5,39	54.21	,5434	42	,96426	—	196,81	289.93	6,88	34,49	,3457
91	,93607	—	90,83	185,41	5,42	53.93	,5406	41	,96487	—	201,61	294.71	6,90	33,93	,3401
100 + 90	,93656	—	91,84	186,39	5,45	53,65	,5377	100 + 40	,96548	—	206,65	299,76	6,89	33,36	,3344
89	,93706	—	92,87	187,39	5,48	53,36	,5349	39	,96608	—	211,95	305,07	6,88	32,78	,3285
88	,93756	—	93,93	188,41	5,52	53,07	,5320	38	,96670	—	217,53	310,64	6,89	32,19	,3226
87	,93806	—	95,01	189,47	5,54	52,78	,5290	37	,96730	—	223,41	316,55	6,86	31,59	,3166
86	,93857	—	96,12	190,54	5,58	52,48	,5260	36	,96792	—	229,61	322,76	6,85	30,98	,3105
100 + 85	,93909	—	97,25	191,65	5,60	52,18	,5230	100 + 35	,96852	—	236,18	329,31	6,87	30,37	,3044
84	,93960	—	98,40	192,77	5,63	51,88	,5200	34	,96913	—	243,13	336,26	6,87	29,74	,2981
83	,94013	—	99,59	193,92	5,67	51,57	,5169	33	,96975	—	250,49	343,65	6,84	29,10	,2917
82	,94065	—	100,81	195,10	5,71	51,26	,5137	32	,97036	—	258,32	351,51	6,81	28,45	,2852
81	,94120	—	102,05	196,32	5,73	50,94	,5105	31	,97098	—	266,65	359,86	6,79	27,79	,2786
100 + 80	,94174	—	103,32	197,56	5,76	50,61	,5073	100 + 30	,97160	—	275,54	368,79	6,75	27,11	,2718
79	,94228	—	104,63	198,83	5,80	50,29	,5040	29	,97223	—	285,04	378,32	6,72	26,43	,2649
78	,94282	—	105,97	200,14	5,83	49.96	,5008	28	,97286	—	295,22	388,54	6,68	25,74	,2580
77	,94337	—	107,35	201,49	5,86	49,63	,4975	27	,97351	—	306,16	399,51	6,65	25,03	,2509
76	,94392	—	108,76	202.86	5,90	49,30	,4941	26	,97416	—	317.93	411.34	6,59	24,31	,2437
100 + 75	,94448	—	110.21	204,29	5,92	48,95	,4906	100 + 25	,97482	—	330,65	424,12	6,53	23,58	,2363
74	,94504	—	111,70	205,74	5,96	48,60	,4872	24	,97550	—	344.43	437.96	6,47	22,83	,2289
73	,94560	—	113,23	207,24	5,99	48.25	,4837	23	,97618	—	359.40	453.00	6,40	22,07	,2213
72	,94617	—	114.80	208,77	6,03	47,90	,4801	22	,97688	—	375,73	469,40	6,33	21,30	,2135
71	,94672	—	116,42	210.37	6,05	47,54	,4765	21	,97760	—	393.03	487,37	6,26	20,51	,2056
100 + 70	,94729	—	118,09	212,00	0,09	47,17	,4728	100 + 20	,97831	—	413.31	507,13	6,18	19,72	,1976
69	,94787	—	119.80	213,66	6,14	46,80	,4691	19	,97907	—	435.07	528,97	6,10	18,90	,1895
68	,94845	—	121,56	215.39	6.17	46.43	,4654	18	,97983	—	459,24	553,23	6,01	18,07	,1812
67	,94903	—	123.37	217,17	6,20	46,05	,4616	17	,98062	—	486,25	580,34	5,91	17,23	,1727
66	,94962	—	125.24	219.01	6.23	45.66	,4577	16	,98143	—	516,64	610.83	5,81	16,37	,1641
100 + 65	,95020	—	127,17	220.90	6,27	45.27	,4537	100 + 15	,98227	—	551,08	645.39	5,69	15.49	,1553
64	,95080	—	129,15	222.85	6,30	44.87	,4497	14	,98312	—	590,45	684,88	5,57	14,60	,1463
63	,95140	—	131,20	224.86	6,34	44.40	,4457	13	,98402	—	635,87	730,42	5,45	13,69	,1372
62	,95201	—	133,32	226,94	6,38	44.09	,4416	12	,98496	—	688,86	783,55	5,31	12,76	,1279
61	,95261	—	135,51	229.10	6.41	43.65	,4375	11	,98592	—	751,48	846.32	5,16	11.82	,1184
100 + 60	,95322	—	137,77	231.34	6,43	43,23	,4333	100 + 10	,98693	—	820,63	921,00	5,03	10,85	,1087
59	,95383	—	140,10	233,63	6.47	42,80	,4291	9	,98798	—	918,48	1013,63	4,85	9.86	,0989
58	,95445	—	142,51	236,01	6,50	42,37	,4248	8	,98909	—	1013,29	1128,61	4,68	8.86	,0888
57	,95506	—	145,01	238,47	6.54	41.93	,4204	7	,99026	—	1180.90	1276,40	4,50	7,83	,0785
56	,95567	—	147.61	241.03	6,58	41.49	,4159	6	,99148	—	1377,72	1473.38	4.34	6.79	,0680
100 + 55	,95629	—	150,29	243,68	6.61	41,04	,4113	100 + 5	,99276	—	1653,27	1749,13	4,14	5,72	,0573
54	,95690	—	153,05	246,42	6,63	40,58	,4067	4	,99412	—	2066,57	2162,03	3,94	4,62	,0464
53	,95751	—	155.93	249,29	6,64	40,11	,4021	3	,99555	—	2755,42	2851,67	3,75	3,50	,0352
52	,95811	—	158,94	252,26	6,68	39,64	,3974	2	,99705	—	4133,14	4229,57	3,57	2,36	,0237
51	,95873	—	162,07	255,37	6,70	39,16	,3925	1	,99864	—	8266,29	8363,90	3,39	1,20	,0120

TABLE I. HEAT 57°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,82642	100	—	100,00	—	100,00	1,0017
1	,82872	—	0,83	100,72	0,11	99,29	,9947
2	,83098	—	1,65	101,44	0,21	98,58	,9876
3	,83318	—	2,48	102,16	0,32	97,88	,9806
4	,83532	—	3,31	102,89	0,42	97,19	,9736
100 + 5	,83740	—	4,13	103,62	0,51	96,50	,9667
6	,83943	—	4,96	104,36	0,60	95,82	,9600
7	,84141	—	5,78	105,10	0,68	95,16	,9533
8	,84335	—	6,61	105,84	0,77	94,49	,9466
9	,84524	—	7,43	106,58	0,85	93,83	,9400
100 + 10	,84709	—	8,26	107,32	0,94	93,18	,9334
11	,84888	—	9,09	108,06	1,03	92,54	,9270
12	,85064	—	9,91	108,81	1,10	91,90	,9206
13	,85236	—	10,74	109,56	1,18	91,27	,9143
14	,85405	—	11,57	110,31	1,26	90,65	,9081
100 + 15	,85571	—	12,39	111,07	1,32	90,04	,9019
16	,85732	—	13,22	111,82	1,40	89,43	,8959
17	,85891	—	14,04	112,57	1,47	88,83	,8899
18	,86046	—	14,87	113,33	1,54	88,24	,8839
19	,86199	—	15,69	114,09	1,60	87,65	,8780
100 + 20	,86348	—	16,52	114,85	1,67	87,07	,8722
21	,86496	—	17,35	115,61	1,74	86,50	,8665
22	,86640	—	18,18	116,37	1,81	85,93	,8608
23	,86782	—	19,00	117,13	1,87	85,37	,8552
24	,86920	—	19,83	117,89	1,94	84,82	,8497
100 + 25	,87057	—	20,66	118,66	2,00	84,27	,8442
26	,87191	—	21,48	119,42	2,06	83,73	,8388
27	,87323	—	22,31	120,19	2,12	83,20	,8334
28	,87452	—	23,14	120,96	2,18	82,67	,8281
29	,87580	—	23,96	121,73	2,23	82,15	,8229
100 + 30	,87705	—	24,79	122,50	2,29	81,64	,8177
31	,87829	—	25,61	123,26	2,35	81,13	,8126
32	,87949	—	26,44	124,03	2,41	80,63	,8076
33	,88070	—	27,27	124,80	2,47	80,13	,8026
34	,88187	—	28,09	125,57	2,52	79,64	,7977
100 + 35	,88304	—	28,92	126,35	2,57	79,15	,7928
36	,88417	—	29,74	127,11	2,63	78,67	,7880
37	,88530	—	30,57	127,88	2,69	78,19	,7833
38	,88640	—	31,40	128,66	2,74	77,72	,7786
39	,88748	—	32,22	129,43	2,79	77,26	,7739
100 + 40	,88855	—	33,05	130,21	2,84	76,80	,7693
41	,88960	—	33,87	130,98	2,89	76,34	,7648
42	,89065	—	34,70	131,76	2,94	75,89	,7603
43	,89168	—	35,52	132,53	2,99	75,45	,7559
44	,89269	—	36,35	133,31	3,04	75,01	,7515
100 + 45	,89367	—	37,18	134,09	3,09	74,58	,7471
46	,89465	—	38,00	134,80	3,14	74,15	,7428
47	,89563	—	38,83	135,64	3,19	73,72	,7385
48	,89658	—	39,66	136,42	3,24	73,30	,7343
49	,89751	—	40,48	137,20	3,28	72,88	,7301

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,89842	100	41,31	137,98	3,33	72,48	,7260
51	,89933	—	42,13	138,76	3,37	72,07	,7219
52	,90021	—	42,96	139,54	3,42	71,66	,7179
53	,90108	—	43,78	140,32	3,46	71,26	,7139
54	,90194	—	44,61	141,10	3,51	70,87	,7100
100 + 55	,90279	—	45,44	141,89	3,55	70,48	,7060
56	,90301	—	46,26	142,67	3,59	70,09	,7021
57	,90442	—	47,09	143,45	3,64	69,70	,6982
58	,90523	—	47,91	144,24	3,67	69,32	,6945
59	,90602	—	48,74	145,02	3,72	68,95	,6907
100 + 60	,90681	—	49,57	145,81	3,76	68,59	,6870
61	,90758	—	50,40	146,60	3,80	68,22	,6833
62	,90834	—	51,23	147,39	3,84	67,85	,6797
63	,90910	—	52,05	148,17	3,88	67,49	,6761
64	,90983	—	52,88	148,96	3,92	67,13	,6724
100 + 65	,91056	—	53,70	149,75	3,95	66,78	,6689
66	,91130	—	54,53	150,54	3,99	66,43	,6655
67	,91203	—	55,35	151,32	4,03	66,08	,6620
68	,91275	—	56,18	152,11	4,07	65,74	,6586
69	,91346	—	57,01	152,90	4,11	65,40	,6552
100 + 70	,91416	—	57,83	153,68	4,15	65,07	,6518
71	,91485	—	58,66	154,47	4,19	64,74	,6485
72	,91553	—	59,49	155,26	4,23	64,41	,6452
73	,91620	—	60,31	156,05	4,26	64,08	,6419
74	,91686	—	61,14	156,84	4,30	63,76	,6387
100 + 75	,91751	—	61,96	157,63	4,33	63,44	,6355
76	,91815	—	62,79	158,42	4,37	63,13	,6323
77	,91877	—	63,61	159,21	4,40	62,81	,6292
78	,91940	—	64,44	160,00	4,44	62,50	,6261
79	,92001	—	65,27	160,79	4,48	62,19	,6230
100 + 80	,92059	—	66,09	161,58	4,51	61,89	,6199
81	,92120	—	66,92	162,38	4,54	61,59	,6169
82	,92180	—	67,75	163,17	4,58	61,29	,6139
83	,92237	—	68,57	163,96	4,61	60,99	,6110
84	,92294	—	69,40	164,75	4,65	60,70	,6081
100 + 85	,92351	—	70,23	165,55	4,68	60,41	,6051
86	,92408	—	71,06	166,34	4,72	60,12	,6022
87	,92463	—	71,88	167,14	4,74	59,83	,5993
88	,92517	—	72,71	167,93	4,78	59,55	,5965
89	,92571	—	73,53	168,73	4,80	59,27	,5937
100 + 90	,92625	—	74,36	169,52	4,84	58,99	,5909
91	,92676	—	75,18	170,31	4,87	58,71	,5881
92	,92728	—	76,01	171,11	4,90	58,44	,5854
93	,92780	—	76,83	171,91	4,92	58,17	,5827
94	,92830	—	77,66	172,70	4,96	57,90	,5800
100 + 95	,92881	—	78,49	173,50	4,99	57,63	,5774
96	,92930	—	79,31	174,29	5,02	57,38	,5748
97	,92979	—	80,13	175,09	5,04	57,12	,5722
98	,93028	—	80,96	175,88	5,08	56,86	,5696
99	,93077	—	81,79	176,68	5,11	56,60	,5670

TABLE II. HEAT 57°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100+100	,93125	100	82,62	177,48	5,14	56,34	,5644	100 + 50	,95900	100	165,24	258,52	6,72	38,68	,3875
99	,93174	—	83,46	178,29	5,17	56,08	,5618	49	,95963	—	168,61	261,89	6,72	38,18	,3825
98	,93224	—	84,31	179,12	5,19	55,83	,5592	48	,96025	—	172,12	265,35	6,77	37,68	,3775
97	,93272	—	85,17	179,97	5,20	55,57	,5566	47	,96088	—	175,78	268,99	6,79	37,17	,3724
96	,93321	—	86,07	180,82	5,25	55,31	,5540	46	,96150	—	179,61	272,80	6,81	36,65	,3672
100 + 95	,93370	—	86,97	181,69	5,28	55,04	,5514	100 + 45	,96212	—	183,61	276,78	6,83	36,13	,3619
94	,93419	—	87,89	182,59	5,30	54,77	,5486	44	,96274	—	187,77	280,92	6,85	35,60	,3566
93	,93468	—	88,83	183,50	5,33	54,50	,5459	43	,96335	—	192,13	285,28	6,85	35,05	,3511
92	,93517	—	89,79	184,43	5,36	54,22	,5432	42	,96397	—	196,71	289,84	6,87	34,50	,3456
91	,93566	—	90,78	185,39	5,39	53,94	,5403	41	,96459	—	201,51	294,63	6,88	33,94	,3400
100 + 90	,93616	—	91,79	186,37	5,42	53,65	,5375	100 + 40	,96521	—	206,55	299,68	6,87	33,37	,3343
89	,93665	—	92,83	187,37	5,46	53,37	,5346	39	,96581	—	211,84	304,98	6,86	32,79	,3285
88	,93716	—	93,89	188,39	5,50	53,08	,5317	38	,96643	—	217,42	310,55	6,87	32,20	,3225
87	,93766	—	94,97	189,44	5,53	52,78	,5288	37	,96704	—	223,30	316,45	6,85	31,60	,3165
86	,93817	—	96,07	190,51	5,56	52,48	,5258	36	,96766	—	229,50	322,66	6,84	30,99	,3104
100 + 85	,93869	—	97,20	191,62	5,58	52,18	,5228	100 + 35	,96827	—	236,06	329,21	6,85	30,38	,3043
84	,93921	—	98,35	192,74	5,61	51,89	,5198	34	,96889	—	243,01	336,15	6,86	29,75	,2980
83	,93973	—	99,54	193,89	5,65	51,58	,5167	33	,96951	—	250,36	343,54	6,82	29,11	,2916
82	,94026	—	100,76	195,08	5,68	51,27	,5135	32	,97013	—	258,19	351,39	6,80	28,46	,2851
81	,94081	—	102,00	196,29	5,71	50,95	,5103	31	,97076	—	266,52	359,74	6,78	27,80	,2785
100 + 80	,94135	—	103,27	197,53	5,74	50,62	,5071	100 + 30	,97138	—	275,40	368,66	6,74	27,12	,2717
79	,94186	—	104,58	198,80	5,78	50,30	,5038	29	,97202	—	284,90	378,18	6,72	26,44	,2649
78	,94244	—	105,92	200,10	5,82	49,97	,5006	28	,97266	—	295,07	388,40	6,67	25,75	,2579
77	,94299	—	107,30	201,45	5,85	49,63	,4973	27	,97331	—	306,01	399,37	6,64	25,04	,2508
76	,94354	—	108,71	202,83	5,88	49,30	,4939	26	,97397	—	317,77	411,19	6,58	24,32	,2436
100 + 75	,94410	—	110,16	204,25	5,91	48,96	,4904	100 + 25	,97464	—	330,48	423,96	6,52	23,59	,2363
74	,94466	—	111,64	205,70	5,94	48,61	,4870	24	,97532	—	344,26	437,79	6,47	22,84	,2288
73	,94522	—	113,17	207,20	5,97	48,26	,4835	23	,97601	—	359,22	452,82	6,40	22,08	,2212
72	,94579	—	114,75	208,74	6,01	47,90	,4799	22	,97671	—	375,54	469,21	6,33	21,31	,2135
71	,94635	—	116,36	210,33	6,03	47,55	,4763	21	,97744	—	393,43	487,17	6,26	20,52	,2056
100 + 70	,94691	—	118,03	211,96	6,07	47,18	,4726	100 + 20	,97816	—	413,10	506,92	6,18	19,72	,1976
69	,94750	—	119,74	213,62	6,12	46,81	,4689	19	,97892	—	434,85	528,75	6,10	18,91	,1895
68	,94808	—	121,50	215,35	6,15	46,43	,4652	18	,97969	—	459,01	552,99	6,02	18,08	,1812
67	,94865	—	123,31	217,14	6,17	46,05	,4614	17	,98048	—	486,01	580,09	5,92	17,24	,1727
66	,94925	—	125,18	218,97	6,21	45,66	,4575	16	,98130	—	516,38	610,56	5,82	16,38	,1641
100 + 65	,94984	—	127,10	220,86	6,24	45,28	,4535	100 + 15	,98215	—	550,81	645,10	5,71	15,50	,1553
64	,95044	—	129,09	222,81	6,28	44,88	,4496	14	,98300	—	590,16	684,57	5,59	14,61	,1463
63	,95105	—	131,13	224,82	6,31	44,47	,4456	13	,98390	—	635,55	730,09	5,46	13,69	,1372
62	,95165	—	133,25	226,90	6,35	44,07	,4415	12	,98485	—	688,52	783,19	5,33	12,77	,1279
61	,95225	—	135,45	229,06	6,39	43,66	,4373	11	,98582	—	751,11	845,92	5,19	11,82	,1184
100 + 60	,95287	—	137,70	231,29	6,41	43,24	,4331	100 + 10	,98684	—	826,22	921,16	5,06	10,85	,1087
59	,95348	—	140,03	233,58	6,45	42,81	,4289	9	,98789	—	918,02	1013,14	4,88	9,87	,0989
58	,95410	—	142,44	235,96	6,48	42,38	,4246	8	,98900	—	1032,78	1128,06	4,72	8,86	,0888
57	,95471	—	144,94	238,42	6,52	41,94	,4202	7	,99017	—	1180,31	1275,78	4,53	7,84	,0785
56	,95533	—	147,54	240,97	6,57	41,49	,4157	6	,99140	—	1377,04	1472,66	4,38	6,79	,0680
100 + 55	,95595	—	150,21	243,62	6,59	41,04	,4112	100 + 5	,99268	—	1652,45	1748,27	4,18	5,72	,0573
54	,95656	—	152,98	246,37	6,61	40,58	,4065	4	,99404	—	2065,54	2161,56	3,98	4,63	,0463
53	,95717	—	155,86	249,24	6,62	40,12	,4019	3	,99548	—	2754,04	2850,24	3,80	3,51	,0351
52	,95778	—	158,86	252,20	6,66	39,64	,3972	2	,99698	—	4131,07	4227,44	3,63	2,37	,0237
51	,95840	—	162,00	255,31	6,69	39,16	,3924	1	,99857	—	8262,16	8358,71	3,45	1,20	,0120

TABLE I. HEAT 58°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W							
100 + 0	,82594	100	—	100,00	—	100,00	1,0011	100 + 50	,89797	100	41,29	137,97	3,32	72,48	,7256
1	,82825	—	0,83	100,72	0,11	99.29	,9941	51	,89888	—	42,11	138,75	3,30	72,07	,7215
2	,83051	—	1,65	101,44	0,21	98,58	,9871	52	,89976	—	42,94	139,53	3,41	71,67	,7176
3	,83271	—	2,48	102,16	0,32	97,88	,9801	53	,90063	—	43,76	140,31	3,45	71,27	,7136
4	,83485	—	3,31	102,89	0.42	97.19	,9731	54	,90149	—	44,59	141,09	3,50	70,88	,7096
100 + 5	,83693	—	4,13	103,63	0,51	96,50	,9662	100 + 55	,90234	—	45,42	141,88	3,54	70,48	,7056
6	,83896	—	4,96	104,36	0,60	95,82	,9595	56	,90317	—	46,24	142,66	3,58	70,10	,7018
7	,84094	—	5,78	105,10	0,68	95,16	,9528	57	,90398	—	47,06	143,44	3,62	69,71	,6979
8	,84289	—	6,61	105,84	0,77	94,49	,9461	58	,90479	—	47,89	144,23	3,66	69,33	,6941
9	,84477	—	7,43	106,58	0,85	93,83	,9395	59	,90558	—	48,71	145,01	3,70	68,96	,6904
100 + 10	,84662	—	8,26	107,32	0,94	93,18	,9329	100 + 60	,90638	—	49,54	145,80	3,74	68,59	,6866
11	,84842	—	9,09	108,06	1,03	92,54	,9265	61	,90714	—	50,37	146,58	3,79	68,22	,6830
12	,85017	—	9,91	108,81	1,10	91,90	,9201	62	,90791	—	51,20	147,37	3,83	67,85	,6794
13	,85189	—	10,73	109,56	1,17	91.27	,9138	63	,90866	—	52,02	148,15	3,87	67,50	,6758
14	,85359	—	11,56	110,31	1.25	90.65	,9076	64	,90940	—	52,85	148,94	3,91	67,14	,6721
100 + 15	,85524	—	12,39	111,06	1,33	90,04	,9014	100 + 65	,91013	—	53,67	149,73	3,94	66,79	,6686
16	,85685	—	13,21	111,82	1,39	89,43	,8954	66	,91087	—	54,50	150,52	3,98	66,44	,6652
17	,85844	—	14,04	112,57	1,47	88,83	,8894	67	,91160	—	55,32	151,30	4,02	66,09	,6617
18	,85999	—	14,87	113,33	1,54	88,24	,8835	68	,91232	—	56,15	152,09	4,06	65,75	,6583
19	,86152	—	15,68	114,09	1,59	87.65	,8776	69	,91303	—	56,98	152,88	4,10	65,41	,6549
100 + 20	,86302	—	16,51	114,85	1,66	87,07	,8717	100 + 70	,91373	—	57,80	153,67	4,13	65,08	,6515
21	,86449	—	17,34	115,61	1,73	86,50	,8660	71	,91442	—	58,63	154,45	4,18	64,75	,6482
22	,86593	—	18,17	116,37	1,80	85,93	,8604	72	,91510	—	59,46	155,24	4,22	64,42	,6449
23	,86735	—	18,99	117,13	1,86	85,37	,8548	73	,91577	—	60,28	156,03	4,25	64,09	,6416
24	,86874	—	19,82	117,89	1,93	84,82	,8493	74	,91643	—	61,11	156,82	4,29	63,77	,6384
100 + 25	,87011	—	20,64	118,65	1,99	84,27	,8438	100 + 75	,91708	—	61,93	157,61	4,32	63,45	,6352
26	,87145	—	21,47	119,42	2,05	83,73	,8384	76	,91772	—	62,76	158,40	4,36	63,13	,6320
27	,87276	—	22,30	120,19	2,11	83,20	,8330	77	,91834	—	63,58	159,19	4,39	62,82	,6289
28	,87406	—	23,13	120,95	2,18	82,67	,8277	78	,91897	—	64,41	159,99	4,42	62,51	,6258
29	,87534	—	23,94	121,73	2,21	82,15	,8225	79	,91958	—	65,23	160,77	4,46	62,20	,6227
100 + 30	,87659	—	24,78	122,49	2,29	81,64	,8173	100 + 80	,92017	—	66,06	161,56	4,50	61,90	,6196
31	,87784	—	25,60	123,26	2,34	81,13	,8122	81	,92078	—	66,88	162,36	4,52	61,59	,6167
32	,87904	—	26,42	124,03	2,39	80,63	,8072	82	,92137	—	67,71	163,15	4,56	61,29	,6136
33	,88025	—	27,25	124,80	2,45	80,13	,8022	83	,92195	—	68,53	163,94	4,59	60,99	,6107
34	,88143	—	28,08	125,57	2,51	79,64	,7973	84	,92252	—	69,36	164,74	4,62	60,71	,6078
100 + 35	,88259	—	28,91	126,34	2,57	79,15	,7924	100 + 85	,92309	—	70,19	165,53	4,66	60,41	,6048
36	,88373	—	29,73	127,10	2,63	78,67	,7876	86	,92366	—	71,02	166,32	4,70	60,12	,6019
37	,88485	—	30,55	127,88	2,67	78,20	,7829	87	,92421	—	71,84	167,12	4,72	59,84	,5990
38	,88595	—	31,38	128,66	2,72	77,73	,7782	88	,92475	—	72,67	167,91	4,76	59,56	,5962
39	,88703	—	32,20	129,42	2,78	77,26	,7735	89	,92529	—	73,49	168,71	4,78	59,27	,5935
100 + 40	,88810	—	33,03	130,21	2,82	76,80	,7689	100 + 90	,92583	—	74,32	169,50	4,82	58,99	,5906
41	,88915	—	33,86	130,97	2,89	76,35	,7644	91	,92635	—	75,14	170,29	4,85	58,72	,5878
42	,89020	—	34,69	131,75	2,94	75,90	,7599	92	,92687	—	75,97	171,09	4,88	58,45	,5851
43	,89123	—	35,51	132,52	2,99	75,45	,7555	93	,92739	—	76,79	171,88	4,91	58,18	,5825
44	,89224	—	36,34	133,31	3,03	75,01	,7511	94	,92789	—	77,62	172,68	4,94	57,91	,5798
100 + 45	,89322	—	37,16	134,08	3,08	74,58	,7467	100 + 95	,92840	—	78,45	173,47	4,98	57,64	,5771
46	,89420	—	37,98	134,85	3,13	74,15	,7424	96	,92889	—	79,27	174,27	5,00	57,38	,5745
47	,89518	—	38,81	135,63	3,18	73,73	,7382	97	,92938	—	80,09	175,07	5,02	57,12	,5719
48	,89613	—	39,64	136,41	3,23	73,31	,7340	98	,92987	—	80,92	175,86	5,06	56,80	,5693
49	,89706	—	40,46	137,19	3,27	72,89	,7297	99	,93036	—	81,75	176,66	5,09	56,61	,5667

TABLE II. HEAT 58°.

I. Water and Spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp								W. + Sp.							
100 + 100	,93084	100	82,58	177,45	5,13	56,35	,5641	100 + 50	,95868	100	165,16	258,46	6,70	38,69	,3873
99	,93133	—	83,42	178,26	5,16	56,09	,5616	49	,95931	—	168,53	261,82	6,71	38,19	,3824
98	,93183	—	84,27	179,09	5,18	55,84	,5590	48	,95994	—	172,03	265,28	6,75	37,69	,3774
97	,93231	—	85,12	179,94	5,18	55,57	,5564	47	,96057	—	175,69	268,92	6,77	37,18	,3723
96	,93280	—	86,02	180,79	5,23	55,31	,5538	46	,96120	—	179,52	272,73	6,79	36,66	,3671
100 + 95	,93329	—	86,92	181,66	5,26	55,05	,5512	100 + 45	,96182	—	183,52	276,71	6,81	36,14	,3618
94	,93378	—	87,84	182,56	5,28	54,78	,5484	44	,96244	—	187,68	280,85	6,83	35,61	,3565
93	,93427	—	88,79	183,47	5,32	54,50	,5457	43	,96306	—	192,04	285,20	6,84	35,06	,3510
92	,93476	—	89,75	184,40	5,35	54,22	,5429	42	,96368	—	196,61	289,76	6,85	34,51	,3455
91	,93525	—	90,74	185,36	5,38	53,95	,5401	41	,96431	—	201,41	294,54	6,87	33,95	,3399
100 + 90	,93575	—	91,75	186,34	5,41	53,66	,5373	100 + 40	,96493	—	206,45	299,59	6,86	33,38	,3342
89	,93625	—	92,78	187,34	5,44	53,38	,5344	39	,96554	—	211,74	304,89	6,85	32,80	,3284
88	,93676	—	93,84	188,36	5,48	53,09	,5315	38	,96616	—	217,31	310,46	6,85	32,21	,3225
87	,93726	—	94,92	189,41	5,51	52,79	,5286	37	,96678	—	223,19	316,35	6,84	31,61	,3165
86	,93777	—	96,02	190,48	5,54	52,49	,5256	36	,96740	—	229,39	322,56	6,83	31,00	,3104
100 + 85	,93829	—	97,15	191,59	5,56	52,19	,5226	100 + 35	,96802	—	235,94	329,10	6,84	30,39	,3042
84	,93881	—	98,30	192,71	5,59	51,89	,5196	34	,96865	—	242,89	336,04	6,85	29,76	,2979
83	,93934	—	99,49	193,86	5,63	51,59	,5165	33	,96927	—	250,24	343,43	6,81	29,12	,2915
82	,93987	—	100,71	195,05	5,66	51,28	,5133	32	,96990	—	258,06	351,27	6,79	28,47	,2850
81	,94042	—	101,95	196,26	5,69	50,95	,5101	31	,97054	—	266,39	359,62	6,77	27,81	,2784
100 + 80	,94096	—	103,22	197,50	5,72	50,63	,5069	100 + 30	,97116	—	275,26	368,54	6,72	27,13	,2716
79	,94151	—	104,53	198,77	5,76	50,31	,5036	29	,97181	—	284,76	378,05	6,71	26,45	,2648
78	,94205	—	105,87	200,07	5,80	49,98	,5004	28	,97246	—	294,93	388,26	6,67	25,76	,2578
77	,94261	—	107,24	201,42	5,82	49,64	,4971	27	,97312	—	305,86	399,23	6,63	25,05	,2508
76	,94316	—	108,65	202,79	5,86	49,31	,4937	26	,97378	—	317,62	411,04	6,58	24,33	,2436
100 + 75	,94372	—	110,10	204,22	5,88	48,97	,4902	100 + 25	,97446	—	330,32	423,80	6,52	23,60	,2362
74	,94428	—	111,59	205,67	5,92	48,62	,4868	24	,97514	—	344,09	437,62	6,47	22,85	,2287
73	,94484	—	113,11	207,17	5,94	48,27	,4833	23	,97584	—	359,04	452,65	6,39	22,09	,2212
72	,94541	—	114,69	208,71	5,98	47,91	,4797	22	,97655	—	375,36	469,02	6,34	21,32	,2134
71	,94597	—	116,30	210,30	6,00	47,56	,4761	21	,97728	—	393,24	486,97	6,27	20,53	,2056
100 + 70	,94653	—	117,97	211,92	6,05	47,19	,4724	100 + 20	,97801	—	412,90	506,71	6,19	19,73	,1976
69	,94712	—	119,68	213,59	6,09	46,81	,4687	19	,97877	—	434,63	528,53	6,10	18,92	,1894
68	,94771	—	121,44	215,31	6,13	46,44	,4650	18	,97955	—	458,78	552,75	6,03	18,09	,1811
67	,94828	—	123,25	217,10	6,15	46,07	,4612	17	,98034	—	485,77	579,84	5,93	17,25	,1736
66	,94889	—	125,12	218,93	6,19	45,67	,4573	16	,98117	—	516,12	610,29	5,83	16,39	,1640
100 + 65	,94948	—	127,04	220,82	6,22	45,28	,4534	100 + 15	,98202	—	550,54	644,81	5,73	15,51	,1553
64	,95008	—	129,02	222,77	6,25	44,89	,4494	14	,98288	—	589,87	684,26	5,61	14,62	,1463
63	,95069	—	131,07	224,78	6,29	44,48	,4454	13	,98379	—	635,22	729,76	5,46	13,70	,1372
62	,95129	—	133,18	226,86	6,32	44,08	,4413	12	,98474	—	688,18	782,83	5,35	12,77	,1279
61	,95190	—	135,38	229,02	6,36	43,66	,4371	11	,98572	—	750,74	845,52	5,22	11,83	,1184
100 + 60	,95252	—	137,63	231,24	6,39	43,25	,4330	100 + 10	,98674	—	825,81	920,73	5,08	10,86	,1087
59	,95313	—	139,96	233,54	6,42	42,82	,4287	9	,98780	—	917,57	1012,66	4,91	9,87	,0989
58	,95376	—	142,37	235,91	6,46	42,39	,4244	8	,98891	—	1032,27	1127,52	4,75	8,87	,0888
57	,95437	—	144,87	238,38	6,49	41,95	,4200	7	,99008	—	1179,73	1275,16	4,57	7,84	,0785
56	,95499	—	147,46	240,92	6,54	41,50	,4155	6	,99132	—	1376,36	1471,94	4,42	6,79	,0680
100 + 55	,95561	—	150,14	243,57	6,57	41,05	,4110	100 + 5	,99260	—	1651,63	1747,41	4,22	5,72	,0573
54	,95622	—	152,91	246,32	6,59	40,59	,4064	4	,99396	—	2064,51	2160,49	4,02	4,63	,0463
53	,95684	—	155,79	249,19	6,60	40,13	,4018	3	,99540	—	2752,68	2848,83	3,85	3,51	,0351
52	,95745	—	158,79	252,15	6,64	39,65	,3970	2	,99691	—	4129,03	4225,35	3,68	2,37	,0237
51	,95807	—	161,92	255,25	6,67	39,17	,3922	1	,99850	—	8258,07	8354,57	3,50	1,20	,0120

TABLE I. HEAT 59°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82547	100	—	100,00	—	100,00	1,0006	100 + 50	,89752	100	41,27	137,96	3,31	72,49	,7253
1	,82778	—	0,83	100,72	0,11	99,29	,9935	51	,89843	—	42,09	138,74	3,35	72,08	,7212
2	,83004	—	1,65	101,44	0,21	98,58	,9865	52	,89931	—	42,92	139,52	3,40	71,67	,7172
3	,83124	—	2,48	102,16	0,32	97,88	,9795	53	,90018	—	43,74	140,30	3,44	71,27	,7132
4	,83438	—	3,30	102,89	0,41	97,19	,9725	54	,90104	—	44,57	141,08	3,49	70,88	,7093
100 + 5	,83646	—	4,12	103,62	0,50	96,50	,9656	100 + 55	,90189	—	45,40	141,87	3,53	70,49	,7053
6	,83849	—	4,95	104,35	0,60	95,82	,9589	56	,90272	—	46,22	142,65	3,57	70,10	,7014
7	,84048	—	5,78	105,10	0,68	95,16	,9522	57	,90354	—	47,04	143,43	3,61	69,71	,6976
8	,84242	—	6,61	105,83	0,78	94,49	,9456	58	,90435	—	47,87	144,22	3,65	69,33	,6938
9	,84430	—	7,43	106,57	0,86	93,83	,9390	59	,90514	—	48,69	145,00	3,69	68,96	,6901
100 + 10	,84615	—	8,26	107,31	0,95	93,19	,9324	100 + 60	,90595	—	49,52	145,79	3,73	68,60	,6863
11	,84795	—	9,08	108,06	1,02	92,55	,9260	61	,90670	—	50,34	146,57	3,77	68,23	,6827
12	,84970	—	9,90	108,80	1,10	91,91	,9196	62	,90747	—	51,17	147,36	3,81	67,86	,6791
13	,85143	—	10,73	109,55	1,18	91,27	,9133	63	,90822	—	51,99	148,14	3,85	67,50	,6755
14	,85312	—	11,55	110,31	1,24	90,66	,9071	64	,90897	—	52,82	148,93	3,89	67,14	,6718
100 + 15	,85477	—	12,38	111,06	1,32	90,04	,9009	100 + 65	,90970	—	53,64	149,72	3,92	66,79	,6683
16	,85639	—	13,21	111,81	1,40	89,44	,8949	66	,91044	—	54,47	150,51	3,96	66,44	,6649
17	,85797	—	14,03	112,57	1,46	88,84	,8889	67	,91117	—	55,29	151,29	4,00	66,09	,6614
18	,85953	—	14,86	113,32	1,54	88,24	,8830	68	,91189	—	56,12	152,08	4,04	65,75	,6580
19	,86105	—	15,68	114,08	1,60	87,65	,8771	69	,91260	—	56,95	152,86	4,09	65,41	,6546
100 + 20	,86256	—	16,51	114,85	1,66	87,07	,8713	100 + 70	,91330	—	57,77	153,65	4,12	65,08	,6512
21	,86402	—	17,33	115,61	1,72	86,50	,8656	71	,91399	—	58,60	154,44	4,16	64,75	,6479
22	,86547	—	18,16	116,36	1,80	85,94	,8599	72	,91467	—	59,43	155,22	4,21	64,42	,6446
23	,86688	—	18,98	117,12	1,86	85,38	,8543	73	,91534	—	60,25	156,02	4,23	64,09	,6413
24	,86827	—	19,81	117,88	1,93	84,83	,8488	74	,91600	—	61,08	156,80	4,28	63,77	,6381
100 + 25	,86964	—	20,63	118,65	1,98	84,28	,8433	100 + 75	,91665	—	61,90	157,59	4,31	63,45	,6349
26	,87098	—	21,46	119,41	2,05	83,74	,8379	76	,91729	—	62,73	158,38	4,35	63,14	,6317
27	,87229	—	22,28	120,18	2,10	83,21	,8326	77	,91791	—	63,55	159,18	4,37	62,82	,6286
28	,87360	—	23,12	120,95	2,17	82,68	,8273	78	,91854	—	64,38	159,97	4,41	62,51	,6255
29	,87488	—	23,93	121,72	2,21	82,16	,8221	79	,91915	—	65,20	160,75	4,45	62,20	,6224
100 + 30	,87614	—	24,76	122,49	2,27	81,65	,8169	100 + 80	,91975	—	66,03	161,54	4,49	61,90	,6194
31	,87738	—	25,58	123,25	2,33	81,14	,8118	81	,92036	—	66,85	162,34	4,51	61,60	,6164
32	,87859	—	26,41	124,02	2,39	80,64	,8068	82	,92095	—	67,68	163,13	4,55	61,30	,6134
33	,87980	—	27,24	124,79	2,45	80,14	,8018	83	,92152	—	68,50	163,92	4,58	61,00	,6104
34	,88098	—	28,06	125,56	2,50	79,64	,7969	84	,92210	—	69,33	164,72	4,61	60,71	,6075
100 + 35	,88214	—	28,89	126,33	2,56	79,16	,7920	100 + 85	,92267	—	70,15	165,51	4,64	60,42	,6045
36	,88328	—	29,71	127,10	2,61	78,68	,7872	86	,92324	—	70,98	166,30	4,68	60,13	,6017
37	,88440	—	30,54	127,87	2,67	78,20	,7825	87	,92379	—	71,81	167,10	4,71	59,84	,5988
38	,88550	—	31,37	128,65	2,72	77,73	,7778	88	,92433	—	72,63	167,89	4,74	59,56	,5960
39	,88658	—	32,19	129,42	2,77	77,27	,7731	89	,92487	—	73,45	168,69	4,76	59,28	,5932
100 + 40	,88765	—	33,02	130,20	2,82	76,81	,7685	100 + 90	,92541	—	74,28	169,48	4,80	59,00	,5904
41	,88870	—	33,84	130,97	2,87	76,35	,7640	91	,92594	—	75,10	170,27	4,83	58,72	,5876
42	,88975	—	34,67	131,75	2,92	75,90	,7595	92	,92646	—	75,93	171,07	4,86	58,45	,5849
43	,89078	—	35,49	132,52	2,97	75,46	,7551	93	,92698	—	76,75	171,86	4,89	58,18	,5822
44	,89179	—	36,32	133,30	3,02	75,02	,7507	94	,92748	—	77,58	172,66	4,92	57,91	,5795
100 + 45	,89277	—	37,14	134,07	3,07	74,59	,7463	100 + 95	,92799	—	78,41	173,45	4,96	57,65	,5768
46	,89375	—	37,96	134,85	3,11	74,16	,7420	96	,92848	—	79,23	174,25	4,98	57,39	,5742
47	,89473	—	38,79	135,62	3,17	73,73	,7378	97	,92897	—	80,05	175,05	5,00	57,13	,5716
48	,89568	—	39,62	136,40	3,22	73,31	,7336	98	,92946	—	80,88	175,84	5,04	56,87	,5691
49	,89661	—	40,44	137,18	3,26	72,90	,7294	99	,92995	—	81,71	176,64	5,07	56,61	,5665

TABLE II. HEAT 59°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,93043	100	82,54	177,43	5,11	56,35	,5639
99	,93092	—	83,38	178,24	5,14	56,10	,5613
98	,93142	—	84,23	179,07	5,16	55,84	,5587
97	,93190	—	85,07	179,91	5,16	55,58	,5562
96	,93239	—	85,98	180,77	5,21	55,32	,5535
100 + 95	,93288	—	86,88	181,64	5,24	55,05	,5509
94	,93337	—	87,80	182,53	5,27	54,78	,5481
93	,93386	—	88,75	183,44	5,31	54,51	,5454
92	,93435	—	89,71	184,37	5,34	54,23	,5427
91	,93484	—	90,70	185,34	5,36	53,95	,5398
100 + 90	,93534	—	91,71	186,32	5,39	53,67	,5370
89	,93585	—	92,74	187,31	5,43	53,39	,5342
88	,93636	—	93,79	188,34	5,45	53,10	,5313
87	,93686	—	94,87	189,38	5,49	52,80	,5284
86	,93737	—	95,97	190,45	5,52	52,50	,5254
100 + 85	,93789	—	97,10	191,56	5,54	52,20	,5223
84	,93842	—	98,25	192,68	5,57	51,90	,5193
83	,93895	—	99,44	193,83	5,61	51,60	,5163
82	,93948	—	100,66	195,02	5,64	51,29	,5131
81	,94003	—	101,90	196,23	5,67	50,96	,5099
100 + 80	,94057	—	103,17	197,47	5,70	50,64	,5067
79	,94112	—	104,48	198,74	5,74	50,32	,5034
78	,94167	—	105,82	200,04	5,78	49,99	,5002
77	,94223	—	107,19	201,39	5,80	49,65	,4969
76	,94278	—	108,60	202,76	5,84	49,32	,4935
100 + 75	,94334	—	110,05	204,19	5,86	48,98	,4900
74	,94390	—	111,53	205,64	5,89	48,63	,4866
73	,94446	—	113,05	207,13	5,92	48,28	,4831
72	,94503	—	114,64	208,68	5,96	47,92	,4795
71	,94560	—	116,25	210,26	5,99	47,56	,4760
100 + 70	,94616	—	117,91	211,88	6,03	47,19	,4722
69	,94674	—	119,62	213,55	6,07	46,82	,4685
68	,94734	—	121,38	215,27	6,11	46,45	,4648
67	,94791	—	123,19	217,06	6,13	46,08	,4610
66	,94853	—	125,06	218,89	6,17	45,68	,4571
100 + 65	,94912	—	126,98	220,78	6,20	45,30	,4532
64	,94971	—	128,96	222,73	6,23	44,90	,4492
63	,95033	—	131,01	224,74	6,27	44,49	,4452
62	,95094	—	133,12	226,82	6,30	44,09	,4412
61	,95155	—	135,31	228,97	6,34	43,67	,4370
100 + 60	,95216	—	137,56	231,19	6,37	43,26	,4328
59	,95278	—	139,89	233,49	6,40	42,83	,4285
58	,95341	—	142,30	235,86	6,44	42,40	,4243
57	,95403	—	144,80	238,33	6,47	41,96	,4199
56	,95465	—	147,39	240,87	6,52	41,51	,4154
100 + 55	,95527	—	150,07	243,52	6,55	41,06	,4109
54	,95589	—	152,84	246,27	6,57	40,60	,4063
53	,95651	—	155,72	249,13	6,59	40,14	,4017
52	,95712	—	158,72	252,10	6,62	39,66	,3969
51	,95774	—	161,84	255,19	6,65	39,18	,3921

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95836	100	165,08	258,40	6,68	38,70	,3872
49	,95899	—	168,45	261,75	6,70	38,20	,3823
48	,95963	—	171,95	265,22	6,73	37,70	,3773
47	,96026	—	175,61	268,86	6,75	37,19	,3722
46	,96089	—	179,43	272,66	6,77	36,67	,3670
100 + 45	,96152	—	183,43	276,64	6,79	36,15	,3617
44	,96215	—	187,59	280,77	6,82	35,62	,3564
43	,96277	—	191,95	285,12	6,83	35,07	,3509
42	,96340	—	196,52	289,68	6,84	34,52	,3454
41	,96403	—	201,31	294,46	6,85	33,96	,3398
100 + 40	,96465	—	206,35	299,51	6,84	33,39	,3341
39	,96527	—	211,64	304,80	6,84	32,81	,3283
38	,96590	—	217,20	310,37	6,83	32,22	,3224
37	,96652	—	223,08	316,25	6,83	31,62	,3164
36	,96715	—	229,28	322,46	6,82	31,01	,3103
100 + 35	,96777	—	235,82	329,00	6,82	30,40	,3041
34	,96841	—	242,77	335,94	6,83	29,77	,2978
33	,96904	—	250,12	343,32	6,80	29,13	,2914
32	,96967	—	257,93	351,15	6,78	28,48	,2850
31	,97032	—	266,26	359,50	6,76	27,82	,2784
100 + 30	,97095	—	275,13	368,41	6,72	27,14	,2716
29	,97160	—	284,62	377,92	6,70	26,46	,2648
28	,97226	—	294,79	388,12	6,67	25,77	,2578
27	,97293	—	305,71	399,09	6,62	25,06	,2507
26	,97359	—	317,47	410,89	6,58	24,34	,2435
100 + 25	,97428	—	330,16	423,64	6,52	23,61	,2362
24	,97497	—	343,92	437,45	6,47	22,86	,2287
23	,97567	—	358,87	452,48	6,39	22,10	,2211
22	,97639	—	375,18	468,83	6,35	21,33	,2134
21	,97712	—	393,05	486,77	6,28	20,54	,2055
100 + 20	,97786	—	412,70	506,50	6,20	19,74	,1975
19	,97863	—	434,42	528,31	6,11	18,93	,1894
18	,97941	—	458,55	552,52	6,03	18,10	,1811
17	,98020	—	485,53	579,59	5,94	17,26	,1726
16	,98104	—	515,87	610,02	5,85	16,40	,1640
100 + 15	,98189	—	550,27	644,53	5,74	15,52	,1552
14	,98276	—	589,58	683,96	5,62	14,62	,1463
13	,98368	—	634,91	729,43	5,48	13,71	,1372
12	,98463	—	687,84	782,47	5,37	12,78	,1279
11	,98562	—	750,37	845,13	5,24	11,84	,1184
100 + 10	,98664	—	825,40	920,30	5,10	10,86	,1087
9	,98771	—	917,12	1012,18	4,94	9,88	,0988
8	,98882	—	1031,76	1126,98	4,78	8,87	,0888
7	,99000	—	1179,15	1274,54	4,61	7,84	,0785
6	,99124	—	1375,68	1471,23	4,45	6,80	,0680
100 + 5	,99252	—	1650,81	1746,55	4,26	5,72	,0573
4	,99388	—	2063,50	2159,43	4,07	4,63	,0463
3	,99532	—	2751,34	2847,43	3,91	3,51	,0351
2	,99683	—	4127,00	4223,27	3,73	2,37	,0237
1	,99842	—	8254,02	8350,45	3,57	1,20	,0120

TABLE I. HEAT 60°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82500	100	—	100,00	—	100,00	1,0000	100 + 50	,89707	100	41,25	137,95	3,30	72,49	,7249
1	,82731	—	0,83	100,72	0,11	99,29	,9929	51	,89797	—	42,07	138,73	3,34	72,08	,7208
2	,82957	—	1,65	101,44	0,21	98,58	,9858	52	,89886	—	42,90	139,51	3,39	71,68	,7168
3	,83177	—	2,47	102,16	0,31	97,88	,9789	53	,89973	—	43,72	140,29	3,43	71,28	,7128
4	,83391	—	3,30	102,89	0,41	97,19	,9719	54	,90059	—	44,55	141,07	3,48	70,89	,7089
100 + 5	,83599	—	4,12	103,62	0,50	96,51	,9651	100 + 55	,90144	—	45,38	141,86	3,52	70,49	,7049
6	,83802	—	4,95	104,35	0,60	95,83	,9583	56	,90227	—	46,20	142,64	3,56	70,11	,7011
7	,84001	—	5,77	105,09	0,68	95,16	,9516	57	,90309	—	47,02	143,42	3,60	69,72	,6972
8	,84195	—	6,60	105,83	0,77	94,50	,9450	58	,90391	—	47,85	144,21	3,64	69,34	,6934
9	,84384	—	7,42	106,57	0,85	93,84	,9384	59	,90470	—	48,67	144,99	3,68	68,97	,6897
100 + 10	,84568	—	8,25	107,31	0,94	93,19	,9319	100 + 60	,90549	—	49,50	145,78	3,72	68,60	,6860
11	,84748	—	9,07	108,05	1,02	92,55	,9255	61	,90626	—	50,32.	146,56	3,76	68,23	,6823
12	,84924	—	9,90	108,80	1,10	91,91	,9191	62	,90703	—	51,15	147,35	3,80	67,87	,6787
13	,85096	—	10,72	109,55	1,17	91,28	,9128	63	,90778	—	51,97	148,13	3,84	67,51	,6751
14	,85265	—	11,55	110,30	1,25	90,66	,9066	64	,90853	—	52,80	148,92	3,88	67,15	,6715
100 + 15	,85430	—	12,37	111,05	1,32	90,04	,9005	100 + 65	,90927	—	53,62	149,71	3,91	66,80	,6680
16	,85592	—	13,20	111,81	1,39	89,44	,8944	66	,91001	—	54,45	150,50	3,95	66,45	,6645
17	,85750	—	14,02	112,56	1,46	88,84	,8884	67	,91074	—	55,27	151,28	3,99	66,10	,6610
18	,85906	—	14,85	113,32	1,53	88,25	,8825	68	,91146	—	56,10	152,07	4,03	65,76	,6576
19	,86058	—	15,67	114,08	1,59	87,66	,8766	69	,91217	—	56,92	152,85	4,07	65,42	,6542
100 + 20	,86208	—	16,50	114,84	1,66	87,08	,8708	100 + 70	,91287	—	57,75	153,64	4,11	65,09	,6509
21	,86355	—	17,32	115,60	1,72	86,51	,8651	71	,91356	—	58,57	154,42	4,15	64,76	,6476
22	,86500	—	18,15	116,36	1,79	85,94	,8594	72	,91424	—	59,40	155,21	4,19	64,43	,6443
23	,86642	—	18,97	117,12	1,85	85,38	,8538	73	,91491	—	60,22	156,00	4,22	64,10	,6410
24	,86781	—	19,80	117,88	1,92	84,83	,8483	74	,91557	—	61,05	156,79	4,26	63,78	,6378
100 + 25	,86918	—	20,62	118,64	1,98	84,28	,8428	100 + 75	,91622	—	61,87	157,58	4,29	63,46	,6346
26	,87052	—	21,45	119,41	2,04	83,74	,8374	76	,91686	—	62,70	158,37	4,33	63,14	,6314
27	,87183	—	22,27	120,18	2,09	83,21	,8321	77	,91748	—	63,52	159,16	4,36	62,83	,6283
28	,87314	—	23,10	120,94	2,16	82,68	,8268	78	,91811	—	64,35	159,95	4,40	62,52	,6252
29	,87442	—	23,92	121,71	2,21	82,16	,8216	79	,91872	—	65,17	160,74	4,43	62,21	,6221
100 + 30	,87569	—	24,75	122,48	2,27	81,65	,8165	100 + 80	,91933	—	66,00	161,53	4,47	61,91	,6191
31	,87692	—	25,57	123,24	2,33	81,14	,8114	81	,91993	—	66,82	162,32	4,50	61,61	,6161
32	,87814	—	26,40	124,01	2,39	80,64	,8064	82	,92052	—	67,65	163,11	4,54	61,31	,6131
33	,87935	—	27,22	124,78	2,44	80,14	,8014	83	,92110	—	68,47	163,90	4,57	61,01	,6101
34	,88053	—	28,05	125,55	2,50	79,65	,7965	84	,92168	—	69,30	164,70	4,60	60,72	,6072
100 + 35	,88169	—	28,87	126,32	2,55	79,16	,7916	100 + 85	,92225	—	70,12	165,49	4,63	60,43	,6043
36	,88283	—	29,70	127,09	2,61	78,68	,7868	86	,92281	—	70,95	166,29	4,66	60,14	,6014
37	,88395	—	30,52	127,86	2,66	78,21	,7821	87	,92336	—	71,77	167,08	4,69	59,85	,5985
38	,88505	—	31,35	128,64	2,71	77,74	,7774	88	,92391	—	72,60	167,87	4,73	59,57	,5957
39	,88613	—	32,17	129,41	2,76	77,27	,7727	89	,92445	—	73,42	168,66	4,76	59,29	,5929
100 + 40	,88720	—	33,00	130,19	2,81	76,81	,7681	100 + 90	,92499	—	74,25	169,46	4,79	59,01	,5901
41	,88825	—	33,82	130,96	2,86	76,36	,7636	91	,92552	—	75,07	170,25	4,82	58,73	,5873
42	,88929	—	34,65	131,74	2,91	75,91	,7591	92	,92604	—	75,90	171,05	4,85	58,46	,5846
43	,89032	—	35,47	132,51	2,96	75,47	,7547	93	,92656	—	76,72	171,84	4,88	58,19	,5819
44	,89133	—	36,30	133,29	3,01	75,03	,7503	94	,92707	—	77,55	172,64	4,91	57,92	,5792
100 + 45	,89232	—	37,12	134,06	3,06	74,59	,7459	100 + 95	,92758	—	78,37	173,43	4,94	57,66	,5766
46	,89330	—	37,95	134,84	3,11	74,16	,7416	96	,92807	—	79,20	174,23	4,97	57,40	,5740
47	,89427	—	38,77	135,61	3,16	73,74	,7374	97	,92856	—	80,02	175,02	5,00	57,14	,5714
48	,89522	—	39,60	136,39	3,21	73,32	,7332	98	,92905	—	80,85	175,82	5,03	56,88	,5688
49	,89615	—	40,42	137,17	3,25	72,90	,7290	99	,92954	—	81,68	176,62	5,06	56,62	,5662

TABLE II. HEAT 60°.

I. Water and spirit by weight.	II. Specific gravity.	III Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,93002	100	82,50	177,41	5,09	56,36	,5636	100 + 50	,95804	100	165,00	258,34	6,66	38,71	,3871
99	,93051	—	83,34	178,22	5,12	56,11	,5611	49	,95867	—	168,37	261,68	6,69	38,21	,3821
98	,93100	—	84,19	179,05	5,14	55,85	,5585	48	,95931	—	171,87	265,16	6,71	37,71	,3771
97	,93149	—	85,02	179,89	5,13	55,59	,5559	47	,95995	—	175,53	268,80	6,73	37,20	,3720
96	,93198	—	85,94	180,74	5,20	55,33	,5533	46	,96058	—	179,35	272,59	6,76	36,68	,3668
100 + 95	,93247	—	86,84	181,61	5,23	55,06	,5506	100 + 45	,96122	—	183,34	276,56	6,78	36,16	,3616
94	,93296	—	87,76	182,50	5,26	54,79	,5479	44	,96185	—	187,50	280,70	6,80	35,63	,3563
93	,93345	—	88,71	183,42	5,29	54,52	,5452	43	,96248	—	191,86	285,05	6,81	35,08	,3508
92	,93394	—	89,67	184,35	5,32	54,24	,5424	42	,96311	—	196,43	289,60	6,83	34,53	,3453
91	,93443	—	90,66	185,31	5,35	53,96	,5396	41	,96374	—	201,21	294,38	6,83	33,97	,3397
100 + 90	,93493	—	91,67	186,29	5,38	53,68	,5368	100 + 40	,96437	—	206,25	299,42	6,83	33,40	,3340
89	,93544	—	92,70	187,29	5,41	53,39	,5339	39	,96500	—	211,54	304,71	6,83	32,82	,3282
88	,93595	—	93,75	188,31	5,44	53,10	,5310	38	,96563	—	217,10	310,28	6,82	32,23	,3223
87	,93646	—	94,83	189,35	5,48	52,81	,5281	37	,96626	—	222,97	316,15	6,82	31,63	,3163
86	,93697	—	95,93	190,42	5,51	52,51	,5251	36	,96689	—	229,17	322,36	6,81	31,02	,3102
100 + 85	,93749	—	97,06	191,53	5,53	52,21	,5221	100 + 35	,96752	—	235,71	328,90	6,81	30,40	,3040
84	,93802	—	98,21	192,65	5,56	51,91	,5191	34	,96816	—	242,65	335,84	6,81	29,78	,2978
83	,93855	—	99,39	193,80	5,59	51,60	,5160	33	,96880	—	250,00	343,21	6,79	29,14	,2914
82	,93909	—	100,61	194,99	5,62	51,29	,5129	32	,96944	—	257,81	351,04	6,77	28,49	,2849
81	,93963	—	101,85	196,20	5,65	50,97	,5097	31	,97009	—	266,13	359,38	6,75	27,83	,2783
100 + 80	,94018	—	103,12	197,44	5,68	50,65	,5065	100 + 30	,97074	—	275,00	368,28	6,72	27,15	,2715
79	,94073	—	104,43	198,71	5,72	50,32	,5032	29	,97139	—	284,48	377,79	6,69	26,47	,2647
78	,94128	—	105,77	200,01	5,76	50,00	,5000	28	,97206	—	294,64	387,99	6,65	25,77	,2577
77	,94184	—	107,14	201,35	5,79	49,66	,4966	27	,97273	—	305,56	398,95	6,61	25,07	,2507
76	,94240	—	108,55	202,73	5,82	49,33	,4933	26	,97340	—	317,31	410,74	6,57	24,35	,2435
100 + 75	,94296	—	110,00	204,15	5,85	48,98	,4898	100 + 25	,97410	—	330,00	423,48	6,52	23,61	,2361
74	,94352	—	111,48	205,60	5,88	48,64	,4864	24	,97479	—	343,75	437,29	6,46	22,87	,2287
73	,94408	—	113,01	207,10	5,91	48,29	,4829	23	,97550	—	358,70	452,31	6,39	22,11	,2211
72	,94465	—	114,58	208,64	5,94	47,93	,4793	22	,97622	—	375,00	468,64	6,36	21,34	,2134
71	,94522	—	116,20	210,22	5,98	47,57	,4757	21	,97696	—	392,86	486,58	6,28	20,55	,2055
100 + 70	,94579	—	117,86	211,84	6,02	47,20	,4720	100 + 20	,97771	—	412,50	506,29	6,21	19,75	,1975
69	,94637	—	119,56	213,51	6,05	46,83	,4683	19	,97848	—	434,21	528,08	6,13	18,94	,1894
68	,94696	—	121,32	215,24	6,08	46,46	,4646	18	,97926	—	458,33	552,29	6,04	18,11	,1811
67	,94756	—	123,13	217,02	6,11	46,08	,4608	17	,98006	—	485,29	579,34	5,95	17,26	,1726
66	,94816	—	125,00	218,85	6,15	45,69	,4569	16	,98090	—	515,62	609,76	5,86	16,40	,1640
100 + 65	,94876	—	126,92	220,74	6,18	45,30	,4530	100 + 15	,98176	—	550,00	644,25	5,75	15,52	,1552
64	,94936	—	128,90	222,69	6,21	44,91	,4491	14	,98264	—	589,29	683,66	5,63	14,63	,1463
63	,94997	—	130,95	224,70	6,25	44,50	,4450	13	,98356	—	634,61	729,10	5,51	13,72	,1372
62	,95058	—	133,06	226,78	6,28	44,10	,4410	12	,98452	—	687,50	782,11	5,39	12,79	,1279
61	,95119	—	135,25	228,93	6,32	43,68	,4368	11	,98551	—	750,00	844,74	5,26	11,84	,1184
100 + 60	,95181	—	137,50	231,14	6,36	43,26	,4326	100 + 10	,98654	—	825,00	919,87	5,13	10,87	,1087
59	,95243	—	139,82	233,44	6,38	42,84	,4284	9	,98761	—	916,67	1011,70	4,97	9,88	,0988
58	,95305	—	142,23	235,82	6,41	42,41	,4241	8	,98873	—	1031,25	1126,44	4,81	8,88	,0888
57	,95368	—	144,73	238,28	6,45	41,97	,4197	7	,98991	—	1178,57	1273,92	4,65	7,85	,0785
56	,95430	—	147,32	240,82	6,50	41,52	,4152	6	,99115	—	1375,00	1470,52	4,48	6,80	,0680
100 + 55	,95493	—	150,00	243,47	6,53	41,07	,4107	100 + 5	,99244	—	1650,00	1745,70	4,30	5,73	,0573
54	,95555	—	152,77	246,22	6,55	40,61	,4061	4	,99380	—	2062,50	2158,37	4,13	4,63	,0463
53	,95617	—	155,65	249,08	6,57	40,15	,4015	3	,99524	—	2750,00	2846,04	3,96	3,51	,0351
52	,95679	—	158,65	252,05	6,60	39,67	,3967	2	,99675	—	4125,00	4221,21	3,79	2,37	,0237
51	,95741	—	161,77	255,14	6,63	39,19	,3919	1	,99834	—	8250,00	8346,38	3,62	1,20	,0120

TABLE I. HEAT 61°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,82453	100	—	100,00	—	100,00	,9994
1	,82684	—	0,82	100,72	0,10	99.29	,9924
2	,82910	—	1,65	101,44	0,21	98,58	,9853
3	,83130	—	2,47	102,16	0,31	97,88	,9784
4	,83344	—	3,30	102,89	0,41	97,19	,9714
100 + 5	,83552	—	4,12	103,62	0,50	96,51	,9645
6	,83755	—	4,95	104,35	0,60	95,83	,9578
7	,83954	—	5,77	105,09	0,68	95,16	,9511
8	,84148	—	6,60	105,83	0,77	94,50	,9445
9	,84337	—	7,42	106,57	0,85	93,84	,9379
100 + 10	,84520	—	8,25	107,31	0,94	93,19	,9314
11	,84701	—	9,07	108,05	1,02	92,55	,9250
12	,84877	—	9,90	108,80	1,10	91,91	,9186
13	,85049	—	10,72	109,55	1,17	91,28	,9123
14	,85218	—	11,54	110,30	1,24	90,66	,9061
100 + 15	,85382	—	12,36	111,05	1,31	90,04	,9000
16	,85545	—	13,19	111,81	1,38	89,44	,8939
17	,85703	—	14,02	112,56	1,46	88,84	,8879
18	,85860	—	14,84	113,32	1,52	88,25	,8820
19	,86012	—	15,66	114,08	1,58	87,66	,8762
100 + 20	,86162	—	16,49	114,84	1,65	87,08	,8703
21	,86309	—	17,31	115,60	1,71	86,51	,8646
22	,86454	—	18,14	116,35	1,79	85,94	,8589
23	,86596	—	18,96	117,11	1,85	85,38	,8534
24	,86735	—	19,79	117,87	1,92	84,83	,8479
100 + 25	,86872	—	20,61	118,64	1,97	84,28	,8424
26	,87006	—	21,44	119,40	2,04	83,74	,8370
27	,87137	—	22,26	120,17	2,09	83,21	,8316
28	,87268	—	23,09	120,94	2,15	82,68	,8264
29	,87396	—	23,91	121,71	2,20	82 16	,8212
100 + 30	,87523	—	24,74	122,48	2,26	81,65	,8161
31	,87646	—	25,56	123,23	2,33	81,15	,8110
32	,87768	—	26,39	124,00	2,39	80,64	,8060
33	,87889	—	27,21	124,78	2,43	80,14	,8010
34	,88007	—	28,04	125,55	2,49	79,65	,7961
100 + 35	,88123	—	28,86	126,32	2,54	79,16	,7912
36	,88237	—	29,69	127,09	2,60	78,68	,7864
37	,88349	—	30,51	127,85	2,66	78,21	,7817
38	,88459	—	31,33	128,63	2,70	77,74	,7770
39	,88567	—	32,16	129,40	2,76	77,28	,7723
100 + 40	,88674	—	32,98	130,18	2,80	76,82	,7677
41	,88780	—	33,80	130,95	2,85	76,36	,7632
42	,88884	—	34,63	131,73	2,90	75,91	,7588
43	,88987	—	35,45	132,50	2,95	75,47	,7544
44	,89088	—	36,28	133,28	3,00	75,03	,7500
100 + 45	,89186	—	37,10	134,05	3,05	74,60	,7456
46	,89285	—	37,93	134,83	3,10	74,17	,7413
47	,89382	—	38,75	135,60	3,15	73,74	,7371
48	,89477	—	39,58	136,38	3,20	73,32	,7329
49	,89570	—	40,40	137,16	3,24	72,91	,7286

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,89662	100	41,23	137,94	3,29	72,50	,7245
51	,89752	—	42,05	138,72	3,33	72,09	,7205
52	,89841	—	42,88	139,50	3,38	71,69	,7165
53	,89928	—	43,70	140,28	3,42	71,28	,7125
54	,90014	—	44,52	141,06	3,46	70.89	,7086
100 + 55	,90100	—	45,35	141,85	3,50	70,50	,7046
56	,90183	—	46,17	142,62	3,55	70,12	,7007
57	,90265	—	46,99	143,40	3,59	69,73	,6968
58	,90347	—	47,82	144,19	3,63	69,35	,6931
59	,90426	—	48,64	144,97	3,67	68,97	,6893
100 + 60	,90504	—	49,47	145,76	3,71	68,60	,6856
61	,90582	—	50,29	146,54	3,75	68,24	,6820
62	,90659	—	51,12	147,33	3,79	67,88	,6783
63	,90734	—	51,94	148,11	3,83	67,52	,6748
64	,90809	—	52,77	148,90	3,87	67,16	,6712
100 + 65	,90883	—	53,59	149,69	3,90	66,80	,6676
66	,90957	—	54.42	150,48	3,94	66,45	,6642
67	,91030	—	55,24	151,26	3,98	66,11	,6607
68	,91102	—	56,07	152,05	4,02	65,76	,6573
69	,91173	—	56,89	152,83	4,06	65,42	,6539
100 + 70	,91242	—	57.72	153,62	4,10	65,09	,6506
71	,91312	—	58,54	154,41	4,13	64,76	,6473
72	,91380	—	59,37	155,19	4,18	64,43	,6440
73	,91447	—	60,19	155,98	4,21	64,10	,6407
74	,91513	—	61,02	156,77	4,25	63,78	,6375
100 + 75	,91578	—	61,84	157,56	4,28	63,47	,6343
76	,91642	—	62,67	158,35	4,32	63,15	,6311
77	,91704	—	63,49	159,14	4,35	62,84	,6280
78	,91767	—	64,32	159,93	4,39	62,52	,6249
79	,91829	—	65,14	160,72	4,42	62,21	,6218
100 + 80	,91890	—	65,96	161,51	4,45	61,91	,6188
81	,91950	—	66,78	162,30	4,48	61,61	,6158
82	,92009	—	67,61	163,09	4,52	61,31	,6128
83	,92067	—	68,43	163,88	4,55	61,01	,6098
84	,92125	—	69,26	164,68	4,58	60,72	,6069
100 + 85	,92182	—	70,08	165,48	4,60	60,43	,6040
86	,92238	—	70,91	166,27	4,64	60,14	,6011
87	,92293	—	71,73	167,07	4,66	59,86	,5983
88	,92348	—	72,56	167,86	4,70	59,58	,5954
89	,92402	—	73.38	168,64	4,74	59.29	,5926
100 + 90	,92455	—	74,21	169,44	4,77	59,01	,5898
91	,92509	—	75,03	170,24	4,79	58,74	,5871
92	,92562	—	75,86	171,03	4,83	58.47	,5844
93	,92614	—	76,68	171,82	4,86	58,20	,5816
94	,92665	—	77,51	172,62	4,89	57,93	,5789
100 + 95	,92716	—	78,33	173,41	4,92	57,66	,5763
96	,92765	—	79,16	174,20	4,96	57,40	,5738
97	,92814	—	79,98	175,00	4,98	57,14	,5712
98	,92864	—	80,81	175,80	5,01	56,88	,5686
99	,92913	—	81,64	176,59	5,05	56,63	,5660

TABLE II. HEAT 61°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92961	100	82,46	177,38	5,08	56,37	,5634	100 + 50	,95771	100	164,92	258,28	6,64	38,71	,3869
99	,93010	—	83,29	178,19	5,10	56,11	,5609	49	,95834	—	168,29	261,62	6,67	38,22	,3820
98	,93059	—	84,14	179,02	5,12	55,86	,5583	48	,95898	—	171,78	265,10	6,68	37,72	,3770
97	,93108	—	84,98	179,86	5,12	55,60	,5557	47	,95962	—	175,44	268,73	6,71	37,21	,3719
96	,93157	—	85,89	180,71	5,18	55,33	,5531	46	,96026	—	179,26	272,52	6,74	36,69	,3667
100 + 95	,93206	—	86,79	181,59	5,20	55,07	,5504	100 + 45	,96090	—	183,25	276,49	6,76	36,16	,3615
94	,93255	—	87,72	182,47	5,25	54,80	,5477	44	,96154	—	187,41	280,63	6,78	35,63	,3562
93	,93304	—	88,66	183,40	5,26	54,53	,5450	43	,96217	—	191,76	284,97	6,79	35,08	,3507
92	,93353	—	89,62	184,32	5,30	54,25	,5422	42	,96281	—	196,33	289,52	6,81	34,53	,3452
91	,93402	—	90,61	185,29	5,32	53,97	,5394	41	,96344	—	201,11	294,30	6,81	33,97	,3396
100 + 90	,93452	—	91,62	186,26	5,36	53,69	,5366	100 + 40	,96408	—	206,15	299,34	6,81	33,40	,3339
89	,93503	—	92,65	187,26	5,39	53,40	,5337	39	,96471	—	211,43	304,62	6,81	32,83	,3281
88	,93554	—	93,70	188,28	5,42	53,11	,5308	38	,96535	—	216,99	310,19	6,80	32,24	,3222
87	,93605	—	94,78	189,33	5,45	52,81	,5279	37	,96598	—	222,86	316,06	6,80	31,64	,3162
86	,93657	—	95,88	190,40	5,48	52,52	,5249	36	,96662	—	229,06	322,25	6,81	31,03	,3101
100 + 85	,93709	—	97,01	191,50	5,51	52,22	,5219	100 + 35	,96725	—	235,59	328,79	6,80	30,41	,3040
84	,93762	—	98,16	192,63	5,53	51,91	,5189	34	,96791	—	242,53	335,73	6,80	29,78	,2977
83	,93815	—	99,34	193,78	5,56	51,61	,5158	33	,96855	—	249,88	343,10	6,78	29,14	,2913
82	,93870	—	100,56	194,96	5,60	51,30	,5127	32	,96920	—	257,68	350,93	6,75	28,49	,2848
81	,93924	—	101,80	196,17	5,63	50,98	,5095	31	,96986	—	266,00	359,26	6,74	27,83	,2782
100 + 80	,93979	—	103,07	197,41	5,66	50,66	,5063	100 + 30	,97051	—	274,86	368,16	6,70	27,16	,2715
79	,94034	—	104,38	198,68	5,70	50,33	,5030	29	,97117	—	284,34	377,65	6,69	26,48	,2647
78	,94089	—	105,71	199,97	5,74	50,00	,4998	28	,97185	—	294,50	387,85	6,65	25,78	,2577
77	,94145	—	107,09	201,32	5,77	49,67	,4964	27	,97252	—	305,41	398,80	6,61	25,08	,2507
76	,94201	—	108,49	202,69	5,80	49,33	,4931	26	,97320	—	317,15	410,58	6,57	24,36	,2435
100 + 75	,94257	—	109,94	204,11	5,83	48,99	,4897	100 + 25	,97389	—	329,84	423,32	6,52	23,62	,2361
74	,94313	—	111,42	205,56	5,86	48,65	,4862	24	,97460	—	343,58	437,12	6,46	22,87	,2287
73	,94369	—	112,95	207,06	5,89	48,30	,4827	23	,97532	—	358,52	452,13	6,39	22,12	,2211
72	,94427	—	114,52	208,60	5,92	47,94	,4791	22	,97604	—	374,82	468,45	6,37	21,35	,2134
71	,94484	—	116,13	210,18	5,95	47,58	,4756	21	,97679	—	392,67	486,38	6,29	20,56	,2055
100 + 70	,94540	—	117,80	211,80	6,00	47,21	,4719	100 + 20	,97755	—	412,30	506,08	6,22	19,76	,1975
69	,94599	—	119,50	213,48	6,02	46,84	,4682	19	,97832	—	434,00	527,86	6,14	18,95	,1894
68	,94659	—	121,26	215,20	6,06	46,47	,4645	18	,97911	—	458,11	552,05	6,06	18,11	,1811
67	,94719	—	123,07	216,98	6,09	46,09	,4607	17	,97992	—	485,06	579,09	5,97	17,27	,1726
66	,94779	—	124,94	218 81	6,13	45,70	,4568	16	,98076	—	515,37	609,50	5,87	16,41	,1640
100 + 65	,94839	—	126,86	220,70	6,16	45,31	,4529	100 + 15	,98162	—	549,73	643,97	5,76	15,53	,1552
64	,94899	—	128,83	222,65	6,18	44,91	,4489	14	,98251	—	589,00	683,36	5,64	14,63	,1463
63	,94961	—	130,88	224,66	6,22	44,51	,4449	13	,98343	—	634,30	728,77	5,53	13,72	,1372
62	,95022	—	132,99	226,74	6,25	44,10	,4409	12	,98440	—	687,17	781,76	5,41	12,79	,1279
61	,95083	—	135,18	228,88	6,30	43,69	,4367	11	,98539	—	749,64	844,36	5,28	11,84	,1184
100 + 60	,95145	—	137,43	231,10	6,33	43,27	,4325	100 + 10	,98642	—	824,60	919,45	5,15	10,87	,1087
59	,95207	—	139,75	233,40	6,35	42,85	,4283	9	,98750	—	916,23	1014,23	5,00	9,89	,0988
58	,95270	—	142,16	235,77	6,39	42,41	,4240	8	,98862	—	1030,75	1125,91	4,84	8,88	,0888
57	,95333	—	144,66	238,23	6,43	41,97	,4196	7	,98981	—	1178,00	1273,32	4,68	7,85	,0785
56	,95395	—	147,25	240,77	6,48	41,53	,4151	6	,99105	—	1374,34	1469,82	4,52	6,80	,0680
100 + 55	,95458	—	149,92	243,42	6,50	41,08	,4106	100 + 5	,99234	—	1649,21	1744,86	4,25	5,73	,0573
54	,95521	—	152,69	246,16	6,53	40,62	,4060	4	,99371	—	2061,51	2157,33	4,18	4,63	,0463
53	,95583	—	155,57	249,02	6,55	40,15	,4014	3	,99515	—	2748,67	2844,66	4,01	3,51	,0351
52	,95645	—	158,57	252,00	6,57	39,68	,3966	2	,99666	—	4123,01	4219,16	3,85	2,37	,0237
51	,95707	—	161,69	255,08	6,61	39,20	,3918	1	,99825	—	8246,03	8342,33	3,69	1,20	,0120

TABLE I. HEAT 62°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82405	100	—	100,00	—	100,00	,9988	100 + 50	,89617	100	41,21	137,93	3,28	72,50	,7242
1	,82637	—	0,82	100,72	0,10	99,29	,9918	51	,89707	—	42,03	138,71	3,32	72,09	,7201
2	,82863	—	1,65	101,44	0,21	98,58	,9848	52	,89796	—	42,86	139,49	3,37	71,69	,7161
3	,83083	—	2,47	102,16	0,31	97,88	,9778	53	,89883	—	43,68	140,27	3,41	71,29	,7121
4	,83297	—	3,30	102,89	0,41	97,19	,9709	54	,89969	—	44,50	141,05	3,45	70,90	,7082
100 + 5	,83504	—	4,12	103,62	0,50	96,51	,9640	100 + 55	,90055	—	45,33	141,83	3,50	70,51	,7042
6	,83708	—	4,95	104,35	0,60	95,83	,9573	56	,90138	—	46,15	142,61	3,54	70,12	,7004
7	,83907	—	5,77	105,09	0,68	95,16	,9506	57	,90221	—	46,97	143,39	3,58	69,73	,6965
8	,84101	—	6,59	105,83	0,76	94,50	,9440	58	,90302	—	47,80	144,18	3,62	69,35	,6928
9	,84290	—	7,42	106,57	0,85	93,84	,9374	59	,90382	—	48,62	144,96	3,66	68,98	,6890
100 + 10	,84473	—	8,24	107,31	0,93	93,19	,9309	100 + 60	,90460	—	49,45	145,75	3,70	68,61	,6853
11	,84654	—	9,06	108,05	1,01	92,55	,9245	61	,90538	—	50,27	146,53	3,74	68,24	,6816
12	,84830	—	9,89	108,80	1,09	91,91	,9181	62	,90615	—	51,10	147,32	3,78	67,88	,6780
13	,85002	—	10,71	109,55	1,16	91,28	,9118	63	,90690	—	51,92	148,10	3,82	67,52	,6745
14	,85171	—	11,54	110,30	1,24	90,66	,9056	64	,90765	—	52,75	148,89	3,86	67,16	,6709
100 + 15	,85335	—	12,36	111,05	1,31	90,04	,8995	100 + 65	,90839	—	53,56	149,68	3,88	66,81	,6673
16	,85498	—	13,18	111,80	1,38	89,44	,8934	66	,90913	—	54,40	150,47	3,93	66,46	,6639
17	,85656	—	14,01	112,56	1,45	88,84	,8874	67	,90986	—	55,21	151,25	3,96	66,11	,6604
18	,85813	—	14,83	113,31	1,52	88,25	,8815	68	,91058	—	56,05	152,04	4,01	65,77	,6570
19	,85965	—	15,65	114,07	1,58	87,66	,8757	69	,91129	—	56,87	152,82	4,05	65,43	,6536
100 + 20	,86115	—	16,48	114,83	1,65	87,08	,8698	100 + 70	,91198	—	57,69	153,61	4,08	65,10	,6503
21	,86263	—	17,30	115,59	1,71	86,51	,8641	71	,91268	—	58,51	154,39	4,12	64,77	,6470
22	,86407	—	18,13	116,35	1,78	85,95	,8585	72	,91336	—	59,34	155,18	4,16	64,44	,6437
23	,86549	—	18,95	117,11	1,84	85,39	,8529	73	,91403	—	60,16	155,97	4,19	64,11	,6404
24	,86689	—	19,78	117,87	1,91	84,84	,8474	74	,91469	—	60,99	156,76	4,23	63,79	,6372
100 + 25	,86825	—	20,60	118,63	1,97	84,29	,8419	100 + 75	,91533	—	61,81	157,55	4,20	63,47	,6340
26	,86960	—	21,43	119,40	2,03	83,75	,8365	76	,91598	—	62,64	158,34	4,30	63,16	,6308
27	,87091	—	22,25	120,17	2,08	83,22	,8312	77	,91660	—	63,46	159,13	4,33	62,84	,6277
28	,87222	—	23,08	120,93	2,15	82,69	,8259	78	,91723	—	64,29	159,92	4,37	62,53	,6246
29	,87350	—	23,90	121,70	2,20	82,17	,8208	79	,91786	—	65,11	160,71	4,40	62,22	,6215
100 + 30	,87476	—	24,73	122,47	2,26	81,65	,8156	100 + 80	,91847	—	65,93	161,50	4,43	61,92	,6185
31	,87600	—	25,55	123,23	2,32	81,15	,8106	81	,91907	—	66,75	162,29	4,46	61,62	,6155
32	,87722	—	26,38	124,00	2,38	80,65	,8055	82	,91966	—	67,58	163,07	4,51	61,32	,6125
33	,87843	—	27,19	124,77	2,42	80,15	,8006	83	,92024	—	68,40	163,87	4,53	61,02	,6095
34	,87961	—	28,02	125,54	2,48	79,65	,7957	84	,92082	—	69,23	164,67	4,56	60,73	,6066
100 + 35	,88076	—	28,85	126,31	2,54	79,17	,7908	100 + 85	,92139	—	70,05	165,46	4,59	60,44	,6037
36	,88191	—	29,67	127,08	2,59	78,69	,7860	86	,92195	—	70,88	166,25	4,63	60,15	,6008
37	,88303	—	30,49	127,85	2,64	78,22	,7813	87	,92250	—	71,70	167,05	4,65	59,87	,5980
38	,88413	—	31,32	128,62	2,70	77,75	,7766	88	,92305	—	72,52	167,84	4,68	59,58	,5951
39	,88521	—	32,14	129,39	2,75	77,28	,7719	89	,92359	—	73,35	168,63	4,72	59,30	,5924
100 + 40	,88628	—	32,97	130,17	2,80	76,82	,7674	100 + 90	,92412	—	74,18	169,43	4,75	59,02	,5896
41	,88734	—	33,79	130,94	2,85	76,37	,7628	91	,92466	—	75,00	170,22	4,78	58,74	,5868
42	,88839	—	34,62	131,72	2,90	75,92	,7584	92	,92519	—	75,83	171,01	4,82	58,47	,5841
43	,88942	—	35,44	132,49	2,95	75,48	,7540	93	,92571	—	76,65	171,81	4,84	58,20	,5814
44	,89043	—	36,26	133,27	2,99	75,04	,7496	94	,92623	—	77,47	172,60	4,87	57,93	,5787
100 + 45	,89141	—	37,09	134,04	3,05	74,60	,7452	100 + 95	,92674	—	78,29	173,39	4,90	57,67	,5761
46	,89240	—	37,91	134,82	3,09	74,17	,7409	96	,92723	—	79,12	174,18	4,94	57,41	,5735
47	,89337	—	38,73	135,59	3,14	73,75	,7367	97	,92772	—	79,94	174,98	4,96	57,15	,5709
48	,89432	—	39,56	136,37	3,19	73,33	,7325	98	,92822	—	80,76	175,77	4,99	56,89	,5683
49	,89525	—	40,38	137,15	3,23	72,91	,7283	99	,92871	—	81,59	176,57	5,02	56,64	,5657

TABLE II. HEAT 62°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92920	100	82,42	177,36	5,06	56,38	,5631	100 + 50	,95737	100	164,84	258,23	6,61	38,72	,3868
99	,92969	—	83,25	178,17	5,08	56,12	,5606	49	,95800	—	168,21	261,56	6,65	38,23	,3819
98	,93018	—	84,10	179,00	5,10	55,87	,5580	48	,95865	—	171,70	265,04	6,66	37,73	,3769
97	,93066	—	84,94	179,84	5,10	55,60	,5554	47	,95929	—	175,35	268,67	6,68	37,22	,3718
96	,93116	—	85,85	180,69	5,16	55,34	,5528	46	,95993	—	179,17	272,46	6,71	36,70	,3666
100 + 95	,93164	—	86,75	181,56	5,19	55,08	,5501	100 + 45	,96058	—	183,16	276,42	6,74	36,17	,3613
94	,93213	—	87,68	182,45	5,23	54,81	,5474	44	,96122	—	187,32	280,56	6,76	35,64	,3561
93	,93262	—	88,62	183,37	5,25	54,54	,5447	43	,96186	—	191,67	284,90	6,77	35,09	,3506
92	,93311	—	89,58	184,30	5,28	54,26	,5419	42	,96250	—	196,23	289,45	6,78	34,54	,3451
91	,93360	—	90,57	185,26	5,31	53,98	,5391	41	,96313	—	201,01	294,23	6,78	33,98	,3395
100 + 90	,93411	—	91,58	186,24	5,34	53,70	,5363	10 + 40	,96378	—	206,05	299,26	6,79	33,41	,3338
89	,93461	—	92,61	187,24	5,37	53,41	,5335	39	,96442	—	211,33	304,53	6,80	32,84	,3280
88	,93512	—	93,66	188,26	5,40	53,12	,5306	38	,96506	—	216,89	310,10	6,79	32,25	,3221
87	,93564	—	94,74	189,30	5,44	52,82	,5277	37	,96570	—	222,75	315,96	6,79	31,65	,3161
86	,93616	—	95,84	190,37	5,47	52,52	,5247	36	,96635	—	228,95	322,15	6,80	31,04	,3100
100 + 85	,93669	—	96,97	191,47	5,50	52,22	,5217	100 + 35	,96698	—	235,48	328,69	6,79	30,42	,3039
84	,93721	—	98,12	192,60	5,52	51,92	,5187	34	,96765	—	242,41	335,62	6,79	29,79	,2977
83	,93775	—	99,30	193,75	5,55	51,62	,5156	33	,96830	—	249,76	343,00	6,76	29,15	,2913
82	,93830	—	100,51	194,93	5,58	51,31	,5125	32	,96895	—	257,56	350,82	6,74	28,50	,2847
81	,93884	—	101,75	196,13	5,62	50,99	,5093	31	,96962	—	265,87	359,15	6,72	27,84	,2781
100 + 80	,93940	—	103,02	197,37	5,65	50,67	,5061	100 + 30	,97028	—	274,73	368,03	6,70	27,17	,2714
79	,93995	—	104,33	198,64	5,69	50,34	,5028	29	,97095	—	284,20	377,52	6,68	26,49	,2646
78	,94050	—	105,66	199,94	5,72	50,01	,4996	28	,97163	—	294,36	387,70	6,66	25,79	,2576
77	,94105	—	107,03	201,29	5,74	49,68	,4962	27	,97231	—	305,26	398,65	6,61	25,09	,2506
76	,94162	—	108,44	202,66	5,78	49,34	,4929	26	,97299	—	317,00	410,42	6,58	24,37	,2434
100 + 75	,94218	—	109,89	204,08	5,81	49,00	,4894	100 + 25	,97369	—	329,68	423,16	6,52	23,63	,2360
74	,94274	—	111,37	205,53	5,84	48,66	,4860	24	,97440	—	343,41	436,95	6,46	22,88	,2286
73	,94330	—	112,89	207,03	5,86	48,30	,4825	23	,97513	—	358,35	451,95	6,40	22,13	,2210
72	,94388	—	114,46	208,57	5,89	47,95	,4789	22	,97586	—	374,64	468,26	6,38	21,35	,2133
71	,94445	—	116,07	210,14	5,93	47,59	,4754	21	,97662	—	392,48	486,18	6,30	20,57	,2054
100 + 70	,94302	—	117,74	211,77	5,97	47,22	,4717	100 + 20	,97740	—	412,10	505,87	6,23	19,77	,1974
69	,94561	—	119,44	213,44	6,00	46,85	,4680	19	,97816	—	433,79	527,64	6,15	18,95	,1893
68	,94621	—	121,20	215,16	6,04	46,47	,4643	18	,97895	—	457,89	551,82	6,07	18,12	,1810
67	,94681	—	123,01	216,94	6,07	46,10	,4605	17	,97977	—	484,83	578,84	5,99	17,28	,1726
66	,94741	—	124,88	218,77	6,11	45,71	,4566	16	,98061	—	515,12	609,24	5,88	16,42	,1640
100 + 65	,94801	—	126,80	220,65	6,15	45,32	,4527	100 + 15	,98148	—	549,47	643,69	5,78	15,54	,1552
64	,94862	—	128,77	222,60	6,17	44,92	,4488	14	,98237	—	588,72	683,06	5,66	14,64	,1463
63	,94924	—	130,81	224,61	6,20	44,52	,4447	13	,98330	—	634,00	728,44	5,56	13,73	,1371
62	,94985	—	132,92	226,70	6,22	44,11	,4407	12	,98427	—	686,84	781,41	5,43	12,80	,1278
61	,95046	—	135,11	228,84	6,27	43,70	,4365	11	,98526	—	749,28	843,98	5,30	11,85	,1184
100 + 60	,95109	—	137,37	231,05	6,32	43,28	,4323	100 + 10	,98630	—	824,20	919,03	5,17	10,88	,1087
59	,95171	—	139,69	233,35	6,34	42,86	,4281	9	,98738	—	915,79	1010,76	5,03	9,89	,0987
58	,95234	—	142,09	235,72	6,37	42,42	,4238	8	,98851	—	1030,26	1125,38	4,88	8,88	,0888
57	,95297	—	144,59	238,18	6,41	41,98	,4194	7	,98970	—	1177,44	1272,72	4,72	7,86	,0785
56	,95360	—	147,18	240,72	6,46	41,54	,4149	6	,99094	—	1373,68	1469,12	4,56	6,81	,0680
100 + 55	,95423	—	149,85	243,37	6,48	41,09	,4104	100 + 5	,99224	—	1648,42	1744,03	4,39	5,73	,0573
54	,95486	—	152,61	246,10	6,51	40,63	,4058	4	,99361	—	2060,52	2156,29	4,23	4,64	,0463
53	,95548	—	155,49	248,96	6,53	40,16	,4012	3	,99505	—	2747,35	2843,29	4,06	3,52	,0351
52	,95610	—	158,48	251,94	6,54	39,69	,3965	2	,99656	—	4121,03	4217,12	3,91	2,37	,0237
51	,95673	—	161,60	255,02	6,58	39,21	,3917	1	,99815	—	8242,06	8338,30	3,76	1,20	,0120

TABLE I. HEAT 63°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82357	100	—	100,00	—	100,00	,9983	100 + 50	,89571	100	41,19	137,92	3,27	72,51	,7238
1	,82589	—	0,82	100,72	0,10	99,29	,9912	51	,89661	—	42,01	138,70	3,31	72,10	,7198
2	,82815	—	1,65	101,44	0,21	98,58	,9842	52	,89750	—	42,84	139,48	3,36	71,69	,7158
3	,83035	—	2,47	102,16	0,31	97,88	,9772	53	,89838	—	43,66	140,26	3,40	71,29	,7117
4	,83250	—	3,30	102,89	0,41	97,19	,9703	54	,89924	—	44,48	141,04	3,44	70,90	,7078
100 + 5	,83457	—	4,12	103,62	0,50	96,51	,9634	100 + 55	,90010	—	45,31	141,82	3,49	70,51	,7039
6	,83661	—	4,94	104,35	0,59	95,83	,9567	56	,90094	—	46,13	142,60	3,53	70,13	,7001
7	,83860	—	5,77	105,09	0,68	95,16	,9501	57	,90177	—	46,95	143,38	3,57	69,74	,6962
8	,84054	—	6,59	105,83	0,76	94,50	,9435	58	,90258	—	47,78	144,17	3,61	69,36	,6924
9	,84243	—	7,42	106,57	0,85	93,84	,9369	59	,90337	—	48,60	144,95	3,65	68,99	,6886
100 + 10	,84426	—	8,24	107,31	0,93	93,19	,9304	100 + 60	,90416	—	49,42	145,73	3,69	68,62	,6850
11	,84607	—	9,06	108,05	1,01	92,55	,9240	61	,90494	—	50,24	146,52	3,72	68,25	,6813
12	,84783	—	9,89	108,80	1,09	91,91	,9176	62	,90571	—	51,07	147,31	3,76	67,89	,6777
13	,84955	—	10,71	109,55	1,16	91,28	,9113	63	,90646	—	51,89	148,09	3 80	67,53	,6741
14	,85124	—	11,53	110,30	1,23	90,66	,9051	64	,90721	—	52,72	148,87	3,85	67,17	,6705
100 + 15	,85288	—	12,35	111,05	1,30	90,05	,8990	100 + 65	,90795	—	53,54	149,66	3,88	66,82	,6670
16	,85451	—	13,18	111,80	1,38	89,44	,8929	66	,90869	—	54,37	150,45	3,92	66,47	,6636
17	,85609	—	14,00	112,56	1,44	88,85	,8869	67	,90941	—	55,19	151,23	3,96	66,12	,6601
18	,85763	—	14,82	113,31	1,51	88,25	,8810	68	,91014	—	56,02	152,02	4.00	65,78	,6567
19	,85919	—	15,65	114,07	1,58	87,66	,8752	69	,91085	—	56,84	152.80	4 04	65-44	,6533
100 + 20	,86069	—	16,47	114,83	1,64	87,08	,8694	100 + 70	,91154	—	57,66	153,59	4.07	65,11	,6500
21	,86217	—	17,29	115,58	1,71	86,51	,8637	71	,91224	—	58,48	154,38	4,10	64,78	,6467
22	,86361	—	18,12	116,34	1,78	85,95	,8580	72	,91291	—	59,31	155.17	4.14	64.45	,6434
23	,86503	—	18,95	117,10	1,85	85,39	,8525	73	,91358	—	60,13	155.95	4,18	64,12	,6401
24	,86642	—	19,77	117,87	1,90	84,84	,8470	74	,91425	—	60,96	156,74	4.22	63.80	,6369
100 + 25	,86779	—	20,60	118,63	1,97	84,29	,8415	100 + 75	,91488	—	61,78	157.53	4.25	63.48	,6337
26	,86914	—	21,42	119,39	2,03	83,75	,8361	76	,91554	—	62,61	158,32	4.29	63,16	,6305
27	,87045	—	22,24	120,16	2,08	83,22	,8307	77	,91616	—	63,43	159.11	4,32	62.85	,6274
28	,87176	—	23,07	120.92	2,15	82,69	,8255	78	,91679	—	64,26	159,90	4,36	62 54	,6243
29	,87304	—	23,89	121,69	2,20	82,17	,8203	79	,91742	—	65,08	160,69	4,39	62,23	,6212
100 + 30	,87430	—	24,71	122,46	2,25	81,66	,8152	100 + 80	,91803	—	65,90	161,48	4.42	61,93	,6182
31	,87553	—	25,53	123,22	2,31	81,15	,8102	81	,91863	—	66,72	162,27	4,45	61,63	,6152
32	,87676	—	26,36	123,99	2,37	80,65	,8051	82	,91922	—	67,55	163.06	4,49	61,33	,6122
33	,87797	—	27,18	124,76	2,42	80,15	,8002	83	,91981	—	68,37	163,85	4,52	61,03	,6092
34	,87915	—	28,01	125,53	2,48	79,66	,7953	84	,92039	—	69,19	164,65	4,54	60,74	,6063
100 + 35	,88030	—	28,83	126,30	2,53	79,17	,7904	100 + 85	,92096	—	70,02	165,44	4 58	60,45	,6034
36	,88145	—	29,66	127,07	2,59	78,69	,7856	86	,92152	—	70,84	166,23	4,61	60,16	,6005
37	,88257	—	30,48	127,84	2,64	78,22	,7809	87	,92207	—	71,67	167,03	4,64	59,87	,5977
38	,88367	—	31,30	128,62	2,68	77,75	,7762	88	,92262	—	72,49	167,82	4,67	59,59	,5949
39	,88475	—	32,13	129,39	2,74	77,29	,7715	89	,92316	—	73,32	168,61	4,71	59,31	,5921
100 + 40	,88582	—	32,95	130.17	2,78	76,83	,7669	100 + 90	,92369	—	74,14	169,41	4,73	59,03	,5893
41	,88688	—	33,77	130,94	2,83	76,37	,7624	91	,92423	—	74,96	170,20	4,76	58,75	,5866
42	,88793	—	34,60	131,71	2,89	75,92	,7580	92	,92476	—	75,79	170,99	4,80	58,48	,5838
43	,88896	—	35,42	132,48	2,94	75,48	,7536	93	,92528	—	76,61	171,79	4,82	58,21	,5811
44	,88998	—	36,25	133,26	2,99	75,04	,7492	94	,92580	—	77,43	172,58	4,85	57,94	,5785
100 + 45	,89098	—	37,07	134,03	3,04	74,61	,7448	100 + 95	,92632	—	78,25	173,37	4,88	57,68	,5758
46	,89195	—	37,89	134,81	3,08	74,18	,7405	96	,92681	—	79,08	174,15	4,93	57,42	,5732
47	,89292	—	38,71	135,58	3,13	73,75	,7363	97	,92730	—	79,90	174,95	4,95	57,16	,5706
48	,89386	—	39,54	136,36	3,18	73,33	,7321	98	,92780	—	80,72	175,75	4,97	56,90	,5681
49	,89479	—	40,36	137,14	3,22	72,92	,7279	99	,92829	—	81,55	176,55	5,00	56,64	,5655

TABLE II. HEAT 63°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92878	100	82,38	177,34	5,04	56,38	,5629	100 + 50	,95703	100	164,76	258,17	6,59	38,73	,3867
99	,92928	—	83,21	178,15	5,06	56,13	,5604	49	,95767	—	168,13	261,50	6,03	38,24	,3818
98	,92976	—	84,06	178,97	5,09	55,87	,5578	48	,95832	—	171,62	264,98	6,64	37,74	,3768
97	,93025	—	84,90	179,81	5,09	55,61	,5552	47	,95896	—	175,27	268,61	6,66	37,23	,3717
96	,93074	—	85,81	180,66	5,15	55,35	,5526	46	,95961	—	179,09	272,40	6,69	36,71	,3665
100 + 95	,93122	—	86,71	181,54	5,17	55,08	,5499	100 + 45	,96026	—	183,07	276,36	5,71	36,18	,3612
94	,93172	—	87,64	182,42	5,22	54,81	,5472	44	,96090	—	187,23	280,49	6,74	35,65	,3560
93	,93220	—	88,58	183,34	5,24	54,54	,5445	43	,96155	—	191,58	284,83	6,75	35,11	,3505
92	,93269	—	89,54	184,27	5,27	54,26	,5417	42	,96219	—	196,14	289,38	6,76	34,55	,3450
91	,93318	—	90,52	185,24	5,28	53,99	,5389	41	,96283	—	200,92	294,15	6,77	33,99	,3394
100 + 90	,93369	—	91,53	186,21	5,32	53,70	,5361	100 + 40	,96348	—	205,95	299,18	6,77	33,42	,3337
89	,93419	—	92,56	187,21	5,35	53,41	,5333	39	,96413	—	211,23	304,45	6,78	32,85	,3279
88	,93471	—	93,61	188,23	5,38	53,12	,5304	38	,96477	—	216,79	310,01	6,78	32,26	,3220
87	,93523	—	94,69	189,27	5,42	52,83	,5275	37	,96542	—	222,64	315,87	6,77	31,66	,3161
86	,93575	—	95,79	190,35	5,44	52,53	,5245	36	,96608	—	228,84	322,05	6,79	31,05	,3100
100 + 85	,93628	—	96,92	191,45	5,47	52,23	,5215	100 + 35	,96672	—	235,37	328,59	6,78	30,43	,3038
84	,93681	—	98,07	192,57	5,50	51,93	,5185	34	,96739	—	242,30	335,52	6,78	29,80	,2976
83	,93735	—	99,25	193,72	5,53	51,62	,5154	33	,96805	—	249,64	342,90	6,74	29,16	,2912
82	,93790	—	100,46	194,90	5,56	51,31	,5123	32	,96871	—	257,44	350,72	6,72	28,51	,2847
81	,93845	—	101,70	196,10	5,60	50,99	,5091	31	,96938	—	265,74	359,03	6,71	27,85	,2781
100 + 80	,93900	—	102,97	197,34	5,63	50,67	,5059	100 + 30	,97005	—	274,60	307,90	6,70	27,18	,2714
79	,93956	—	104,28	198,61	5,67	50,35	,5026	29	,97073	—	284,06	377,39	6,67	26,50	,2645
78	,94011	—	105,61	199,91	5,70	50,02	,4994	28	,97141	—	294,22	387,56	6,66	25,80	,2575
77	,94066	—	106,98	201,26	5,72	49,69	,4960	27	,97210	—	305,11	398,50	6,61	25,10	,2505
76	,94123	—	108,39	202,63	5,76	49,35	,4927	26	,97278	—	316,85	410,27	6,58	24,38	,2433
100 + 75	,94178	—	109,83	204,05	5,78	49,01	,4892	100 + 25	,97349	—	329,52	423,00	6,52	23,64	,2360
74	,94235	—	111,31	205,50	5,81	48,66	,4858	24	,97421	—	343,25	436,78	6,47	22,89	,2286
73	,94291	—	112,83	206,99	5,84	48,31	,4823	23	,97494	—	358,18	451,77	6,41	22,13	,2210
72	,94349	—	114,41	208,54	5,87	47,95	,4787	22	,97568	—	374,46	468,08	6,38	21,36	,2133
71	,94406	—	116,01	210,11	5,90	47,60	,4752	21	,97645	—	392,29	485,98	6,31	20,58	,2054
100 + 70	,94364	—	117,68	211,73	5,95	47,23	,4715	100 + 20	,97723	—	411,90	505,66	6,24	19,77	,1974
69	,94523	—	119,38	213,40	5,98	46,86	,4678	19	,97800	—	433,58	527,42	6,16	18,96	,1893
68	,94583	—	121,14	215,12	6,02	46,48	,4641	18	,97879	—	457,67	551,59	6,08	18,13	,1810
67	,94643	—	122,95	216,90	6,05	46,10	,4603	17	,97962	—	484,60	578,59	6,01	17,29	,1725
66	,94703	—	124,82	218,73	6,09	45,72	,4564	16	,98047	—	514,88	608,98	5,90	16,43	,1639
100 + 65	,94763	—	126,74	220,61	6,13	45,33	,4525	100 + 15	,98134	—	549,21	643,41	5,80	15,55	,1552
64	,94825	—	128,71	222,56	6,15	44,93	,4486	14	,98223	—	588,44	682,76	5,68	14,65	,1463
63	,94887	—	130,75	224,57	6,18	44,53	,4445	13	,98317	—	633,70	728,12	5,58	13,74	,1371
62	,94948	—	132,86	226,65	6,21	44,12	,4405	12	,98414	—	686,51	781,06	5,45	12,80	,1278
61	,95010	—	135,05	228,79	6,26	43,71	,4363	11	,98514	—	748,92	843,60	5,32	11,85	,1183
100 + 60	,95073	—	137,30	231,00	6,30	43,29	,4321	100 + 10	,98618	—	823,81	918,61	5,20	10,88	,1087
59	,95135	—	139,62	233,30	6,32	42,87	,4279	9	,98726	—	915,35	1010,29	5,06	9,90	,0988
58	,95198	—	142,02	235,67	6,35	42,43	,4236	8	,98840	—	1029,77	1124,86	4,91	8,89	,0888
57	,95261	—	144,52	238,13	6,39	41,99	,4192	7	,98960	—	1176,88	1272,12	4,76	7,86	,0785
56	,95325	—	147,11	240,67	6,44	41,55	,4148	6	,99084	—	1373,62	1468,42	4,60	6,81	,0680
100 + 55	,95388	—	149,78	243,32	6,46	41,09	,4103	100 + 5	,99214	—	1647,63	1743,20	4,43	5,73	,0573
54	,95451	—	152,53	246,05	6,48	40,64	,4057	4	,99351	—	2059,53	2155,26	4,27	4,64	,0463
53	,95513	—	155,41	248,90	6,51	40,17	,4011	3	,99495	—	2746,03	2841,93	4,10	3,52	,0351
52	,95576	—	158,40	251,88	6,52	39,70	,3964	2	,99646	—	4119,06	4215,10	3,96	2,37	,0237
51	,95639	—	161,52	254,96	6,56	39,22	,3916	1	,99805	—	8238,12	8334,30	3,82	1,20	,0120

TABLE I. HEAT 64°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82310	100	—	100,00	—	100,00	,9977	100 + 50	,89525	100	41,17	137,91	3,26	72,51	,7235
1	,82541	—	0,82	100,72	0,10	99,29	,9906	51	,89610	—	41,99	138,69	3,30	72,10	,7194
2	,82767	—	1,65	101,44	0,21	98,58	,9836	52	,89705	—	42,82	139,47	3,35	71,70	,7154
3	,82987	—	2,47	102,16	0,31	97,88	,9766	53	,89793	—	43,64	140,25	3,39	71,30	,7114
4	,83202	—	3,29	102,89	0,40	97,19	,9698	54	,89879	—	44,46	141,03	3,43	70,91	,7075
100 + 5	,83409	—	4,11	103,62	0,49	96,51	,9629	100 + 55	,89965	—	45,29	141,81	3,48	70,51	,7035
6	,83614	—	4,94	104,35	0,59	95,83	,9562	56	,90049	—	46,11	142,59	3,52	70,13	,6997
7	,83813	—	5,77	105,09	0,68	95,17	,9495	57	,90132	—	46,93	143,37	3,56	69,74	,6958
8	,84007	—	6,59	105,82	0,77	94,50	,9429	58	,90214	—	47,76	144,16	3,60	69,36	,6921
9	,84196	—	7,41	106,56	0,85	93,84	,9363	59	,90293	—	48,58	144,94	3,64	68,99	,6883
100 + 10	,84379	—	8,24	107,30	0,94	93,20	,9298	100 + 60	,90372	—	49,40	145,72	3,68	68,63	,6846
11	,84560	—	9,06	108,05	1,01	92,56	,9234	61	,90450	—	50,22	146,51	3,71	68,26	,6809
12	,84736	—	9 88	108,79	1,09	91,92	,9171	62	,90527	—	51,05	147,29	3,76	67,89	,6773
13	,84908	—	10,70	109,55	1,15	91,29	,9108	63	,90602	—	51,87	148,08	3,79	67,54	,6738
14	,85076	—	11,52	110,29	1,23	90,67	,9046	64	,90677	—	52,69	148,86	3,83	67,18	,6702
100 + 15	,85241	—	12,35	111,05	1,30	90,05	,8985	100 + 65	,90751	—	53,52	149,65	3,87	66,82	,6667
16	,85403	—	13,17	111,80	1,37	89,45	,8924	66	,90825	—	54,34	150,43	3,91	66,47	,6632
17	,85562	—	14 00	112,56	1,44	88,85	,8864	67	,90897	—	55,16	151,22	3,94	66,12	,6598
18	,85719	—	14,82	113,31	1,51	88,26	,8805	68	,90970	—	55,99	152,00	3,99	65,78	,6564
19	,85872	—	15,64	114,07	1,57	87,67	,8747	69	,91041	—	56,81	152,79	4,02	65,45	,6530
100 + 20	,86022	—	16,46	114,82	1,64	87,09	,8689	100 + 70	,91110	—	57,63	153,58	4,05	65,11	,6496
21	,86170	—	17,29	115,58	1,71	86,52	,8632	71	,91180	—	58,45	154,36	4,09	64,78	,6464
22	,86314	—	18,11	116,34	1,77	85,95	,8576	72	,91247	—	59,28	155,15	4,13	64,45	,6431
23	,86456	—	18,94	117,10	1,84	85,39	,8521	73	,91314	—	60,10	155,94	4,16	64,12	,6398
24	,86596	—	19,76	117,86	1,90	84,84	,8465	74	,91380	—	60,93	156,73	4,20	63,80	,6366
100 + 25	,86732	—	20,59	118,63	1,96	84,29	,8410	100 + 75	,91444	—	61,75	157,51	4,24	63,48	,6334
26	,86868	—	21,41	119,39	2,02	83,76	,8356	76	,91510	—	62,58	158,31	4,27	63,17	,6302
27	,86999	—	22,23	120,16	2,07	83,23	,8303	77	,91572	—	63,40	159,09	4,31	62,85	,6271
28	,87130	—	23,06	120,92	2,14	82,70	,8250	78	,91635	—	64,23	159,88	4,35	62,54	,6240
29	,87258	—	23.88	121,69	2,19	82,17	,8198	79	,91698	—	65,05	160,68	4,37	62,23	,6209
100 + 30	,87384	—	24,70	122,46	2,24	81,66	,8148	100 + 80	,91759	—	65,87	161,46	4,41	61,93	,6179
31	,87507	—	25,52	123,22	2,30	81,16	,8097	81	,91819	—	66,69	162,25	4,44	61,63	,6149
32	,87630	—	26,35	123,99	2,36	80,66	,8047	82	,91879	—	67,52	163,04	4,48	61,33	,6119
33	,87751	—	27,17	124,76	2,41	80,16	,7998	83	,91938	—	68,34	163,84	4,50	61,03	,6089
34	,87869	—	27,99	125,53	2,46	79,66	,7949	84	,91996	—	69,16	164,63	4,53	60,74	,6060
100 + 35	,87984	—	28,82	126,30	2,52	79,17	,7900	100 + 85	,92053	—	69,99	165,42	4,57	60,45	,6031
36	,88099	—	29,64	127,07	2,57	78,69	,7852	86	,92109	—	70,81	166,21	4,60	60,16	,6002
37	,88211	—	30,46	127,83	2,63	78,22	,7805	87	,92164	—	71,64	167,01	4,63	59,88	,5974
38	,88321	—	31,29	128,61	2,68	77,75	,7758	88	,92219	—	72,46	167,80	4,66	59,60	,5946
39	,88429	—	32.11	129,38	2,73	77,29	,7711	89	,92273	—	73,28	168,60	4,68	59,31	,5918
100 + 40	,88536	—	32,93	130,16	2,77	76,83	,7666	100 + 90	,92326	—	74,11	169,39	4,72	59,03	,5890
41	,88642	—	33,76	130,93	2,83	76,37	,7620	91	,92380	—	74,93	170,18	4,75	58,76	,5863
42	,88747	—	34,59	131,70	2,89	75,92	,7576	92	,92433	—	75,76	170,97	4,79	58,49	,5836
43	,88850	—	35,41	132,47	2,94	75,49	,7532	93	,92485	—	76,57	171,77	4,80	58,22	,5808
44	,88952	—	36,23	133,25	2,98	75,04	,7488	94	,92537	—	77,39	172,56	4,83	57,95	,5782
100 + 45	,89051	—	37,06	134,02	3,04	74,61	,7444	100 + 95	,92589	—	78,21	173,35	4,86	57,68	,5755
46	,89150	—	37,87	134,80	3,07	74,18	,7401	96	,92639	—	79,04	174,13	4,91	57,42	,5730
47	,89246	—	38,69	135,57	3,12	73,76	,7359	97	,92688	—	79,86	174,93	4,93	57,16	,5704
48	,89340	—	39,52	136,35	3,17	73,34	,7317	98	,92738	—	80,68	175,72	4,96	56,90	,5678
49	,89433	—	40,34	137,13	3,21	72,92	,7275	99	,92787	—	81,51	176,52	4,99	56,65	,5652

TABLE II. HEAT 64°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100+100	,92836	100	82,34	177,32	5,02	56,39	,5626	100 + 50	,95669	100	164,68	258,11	6,57	38,74	,3865
99	,92886	—	83,17	178,13	5,04	56,13	,5601	49	,95734	—	168,05	261,44	6,61	38,25	,3816
98	,92935	—	84,02	178,95	5,07	55,80	,5576	48	,95799	—	171,54	264,92	6,62	37,75	,3767
97	,92983	—	84,87	179,79	5,08	55,62	,5549	47	,95863	—	175,19	268,55	6,64	37,24	,3716
96	,93033	—	85,77	180,64	5,13	55,35	,5523	46	,95929	—	179,00	272,33	6,67	36,72	,3664
100 + 95	,93081	—	86,67	181,51	5,16	55,09	,5497	100 + 45	,95994	—	182,98	276,29	6,69	36,19	,3611
94	,93130	—	87,60	182,40	5,20	54,82	,5469	44	,96059	—	187,14	280,42	6,72	35,66	,3558
93	,93179	—	88,54	183,32	5,22	54,55	,5442	43	,96124	—	191,49	284,76	6,73	35,11	,3504
92	,93228	—	89,50	184,25	5,25	54,27	,5414	42	,96188	—	196,15	289,31	6,74	34,56	,3449
91	,93277	—	90,48	185,21	5,27	53,99	,5386	41	,96253	—	200,83	294,08	6,75	34,00	,3393
100 + 90	,93327	—	91,49	186,19	5,30	53,71	,5358	100 + 40	,96318	—	205,85	299,10	6,75	33,43	,3336
89	,93378	—	92,51	187,19	5,32	53,42	,5331	39	,96384	—	211,13	304,37	6,76	32,86	,3278
88	,93430	—	93,56	188,20	5,36	53,13	,5302	38	,96449	—	216,69	309,92	6,77	32,27	,3219
87	,93482	—	94,64	189,25	5,39	52,84	,5273	37	,96514	—	222,54	315,77	6,77	31,67	,3160
86	,93534	—	95,75	190,32	5,43	52,54	,5243	36	,96581	—	228,73	321,95	6,78	31,06	,3099
100 + 85	,93587	—	96,87	191,42	5,45	52,24	,5212	100 + 35	,96646	—	235,26	328,49	6,77	30,44	,3037
84	,93641	—	98,03	192,54	5,49	51,94	,5182	34	,96713	—	242,18	335,42	6,76	29,81	,2975
83	,93695	—	99,21	193,69	5,52	51,63	,5152	33	,96780	—	249,52	342,80	6,72	29,17	,2911
82	,93750	—	100,41	194,87	5,54	51,32	,5121	32	,96847	—	257,32	350,61	6,71	28,52	,2846
81	,93806	—	101,65	196,07	5,58	51,00	,5089	31	,96914	—	265,61	358,92	6,69	27,86	,2780
100 + 80	,93861	—	102,92	197,31	5,61	50,68	,5056	100 + 30	,96982	—	274,47	367,78	6,69	27,19	,2713
79	,93917	—	104,23	198,58	5,65	50,36	,5024	29	,97051	—	283,93	377,26	6,67	26,51	,2645
78	,93972	—	105,56	199,88	5,68	50,03	,4992	28	,97119	—	294,08	387,42	6,66	25,81	,2575
77	,94027	—	106,93	201,23	5,70	49,69	,4958	27	,97189	—	304,97	398,36	6,61	25,11	,2505
76	,94183	—	108,34	202,60	5,74	49,35	,4925	26	,97258	—	316,70	410,12	6,58	24,39	,2433
100 + 75	,94139	—	109,78	204,01	5,77	49,01	,4890	100 + 25	,97329	—	329,36	422,84	6,52	23,65	,2360
74	,94196	—	111,26	205,47	5,79	48,67	,4856	24	,97402	—	343,09	436,61	6,48	22,90	,2286
73	,94252	—	112,78	206,95	5,83	48,32	,4821	23	,97475	—	358,01	451,59	6,42	21,14	,2210
72	,94310	—	114,35	208,50	5,85	47,96	,4785	22	,97550	—	374,28	467,90	6,38	21,37	,2132
71	,94368	—	115,96	210,08	5,88	47,61	,4750	21	,97628	—	392,10	485,79	6,31	20,58	,2054
100 + 70	,94326	—	117,62	211,70	5,92	47,24	,4713	100 + 20	,97706	—	411,71	505,45	6,26	19,78	,1974
69	,94485	—	119,32	213,36	5,96	46,87	,4676	19	,97784	—	433,37	527,20	6,17	18,97	,1892
68	,94545	—	121,08	215,08	6,00	46,49	,4639	18	,97864	—	457,45	551,36	6,09	18,14	,1809
67	,94605	—	122,89	216,86	6,03	46,11	,4601	17	,97947	—	484,37	578,35	6,02	17,29	,1725
66	,94666	—	124,76	218,69	6,07	45,73	,4562	16	,98033	—	514,64	608,72	5,92	16,43	,1639
100 + 65	,94725	—	126,68	220,57	6,11	45,34	,4523	100 + 15	,98120	—	548,95	643,13	5,82	15,55	,1551
64	,94788	—	128,65	222,51	6,14	44,94	,4484	14	,98210	—	588,16	682,46	5,70	14,65	,1462
63	,94850	—	130,69	224,52	6,17	44,54	,4444	13	,98304	—	633,40	727,80	5,60	13,74	,1371
62	,94912	—	132,80	226,61	6,19	44,13	,4403	12	,98401	—	686,18	780,71	5,47	12,81	,1278
61	,94974	—	134,98	228,74	6,24	43,72	,4362	11	,98502	—	748,56	843,22	5,34	11,86	,1183
100 + 60	,95037	—	137,23	230,96	6,27	43,30	,4320	100 + 10	,98606	—	823,42	918,19	5,23	10,89	,1087
59	,95099	—	139,55	233,25	6,30	42,87	,4277	9	,98715	—	914,91	1009,83	5,08	9,90	,0988
58	,95162	—	141,95	235,62	6,33	42,44	,4234	8	,98829	—	1029,28	1124,34	4,94	8,89	,0887
57	,95226	—	144,45	238,08	6,37	42,00	,4190	7	,98950	—	1176,32	1271,52	4,80	7,86	,0785
56	,95290	—	147,04	240,62	6,42	41,56	,4146	6	,99074	—	1372,37	1467,73	4,64	6,81	,0680
100 + 55	,95353	—	149,71	243,27	6,44	41,10	,4101	100 + 5	,99204	—	1646,84	1742,37	4,47	5,74	,0573
54	,95416	—	152,45	246,00	6,45	40,65	,4055	4	,99341	—	2058,55	2154,24	4,31	4,64	,0463
53	,95479	—	155,33	248,85	6,48	40,18	,4010	3	,99485	—	2744,72	2840,58	4,14	3,52	,0351
52	,95542	—	158,32	251,82	6,50	39,71	,3963	2	,99636	—	4117,09	4213,09	4,00	2,37	,0237
51	,95605	—	161,44	254,90	6,54	39,23	,3915	1	,99795	—	8234,20	8330,33	3,87	1,20	,0120

TABLE I. HEAT 65°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,82262	100	—	100,00	—	100,00	,9971
1	,82493	—	0,82	100,72	0,10	99,29	,9900
2	,82719	—	1,65	101,44	0,21	98,58	,9830
3	,82939	—	2,47	102,16	0,31	97,88	,9760
4	,83154	—	3,29	102,89	0,40	97,19	,9691
100 + 5	,83362	—	4,11	103,62	0,49	96,51	,9623
6	,83566	—	4,94	104,35	0,59	95,84	,9556
7	,83765	—	5,76	105,08	0,68	95,17	,9489
8	,83960	—	6,58	105,82	0,76	94,50	,9423
9	,84150	—	7,41	106,56	0,85	93,85	,9358
100 + 10	,84334	—	8,23	107,30	0,93	93,20	,9293
11	,84513	—	9,05	108,04	1,01	92,56	,9229
12	,84689	—	9,88	108,79	1,09	91,92	,9166
13	,84861	—	10,70	109,54	1,16	91,29	,9103
14	,85029	—	11,52	110,29	1,23	90,67	,9041
100 + 15	,85193	—	12,34	111,04	1,30	90,05	,8980
16	,85355	—	13,17	111,79	1,38	89,45	,8919
17	,85515	—	13,99	112,55	1,44	88,85	,8859
18	,85672	—	14,81	113,30	1,51	88,26	,8800
19	,85826	—	15,64	114,06	1,58	87,67	,8742
100 + 20	,85976	—	16,46	114,82	1,64	87,09	,8684
21	,86123	—	17,28	115,57	1,71	86,52	,8627
22	,86268	—	18,10	116,33	1,77	85,96	,8571
23	,86410	—	18,93	117,09	1,84	85,40	,8515
24	,86549	—	19,75	117,86	1,89	84,85	,8460
100 + 25	,86680	—	20,58	118,62	1,96	84,30	,8406
26	,86821	—	21,40	119,38	2,02	83,76	,8352
27	,86953	—	22,22	120,15	2,07	83,23	,8299
28	,87083	—	23,05	120,91	2,14	82,70	,8246
29	,87211	—	23,87	121,68	2,19	82,18	,8194
100 + 30	,87337	—	24,69	122,45	2,24	81,67	,8143
31	,87461	—	25,51	123,21	2,30	81,16	,8092
32	,87583	—	26,34	123,98	2,36	80,66	,8042
33	,87704	—	27,16	124,75	2,41	80,16	,7993
34	,87822	—	27,98	125,52	2,46	79,67	,7944
100 + 35	,87938	—	28,81	126,29	2,52	79,18	,7896
36	,88052	—	29,63	127,06	2,57	78,70	,7848
37	,88164	—	30,45	127,83	2,62	78,23	,7800
38	,88274	—	31,27	128,60	2,67	77,76	,7753
39	,88383	—	32,10	129,37	2,73	77,30	,7707
100 + 40	,88490	—	32,92	130,15	2,77	76,84	,7662
41	,88596	—	33,74	130,92	2,82	76,38	,7616
42	,88701	—	34,57	131,69	2,88	75,93	,7572
43	,88804	—	35,39	132,46	2,93	75,49	,7528
44	,88906	—	36,21	133,24	2,97	75,05	,7484
100 + 45	,89006	—	37,04	134,01	3,03	74,62	,7440
46	,89104	—	37,86	134,79	3,07	74,19	,7397
47	,89200	—	38,68	135,57	3,11	73,76	,7355
48	,89294	—	39,50	136,34	3,16	73,34	,7313
49	,89387	—	40,33	137,12	3,21	72,93	,7272
Sp. + W.							
100 + 50	,89479	100	41,15	137,90	3,25	72,52	,7231
51	,89570	—	41,97	138,68	3,29	72,11	,7190
52	,89659	—	42,80	139,46	3,34	71,70	,7150
53	,89747	—	43,62	140,24	3,38	71,30	,7110
54	,89834	—	44,44	141,02	3,42	70,91	,7071
100 + 55	,89920	—	45,27	141,80	3,47	70,52	,7032
56	,90004	—	46,09	142,58	3,51	70,13	,6993
57	,90087	—	46,91	143,36	3,55	69,75	,6955
58	,90168	—	47,74	144,15	3,59	69,37	,6917
59	,90248	—	48,56	144,93	3,63	69,00	,6880
100 + 60	,90328	—	49,38	145,71	3,67	68,63	,6843
61	,90406	—	50,20	146,50	3,70	68,26	,6806
62	,90483	—	51,03	147,28	3,75	67,90	,6770
63	,90558	—	51,85	148,07	3,78	67,54	,6734
64	,90633	—	52,67	148,85	3,82	67,18	,6698
100 + 65	,90707	—	53,50	149,64	3,86	66,83	,6663
66	,90781	—	54,32	150,42	3,90	66,48	,6628
67	,90853	—	55,14	151,21	3,93	66,13	,6594
68	,90925	—	55,97	151,99	3,98	65,79	,6560
69	,90996	—	56,79	152,78	4,01	65,45	,6526
100 + 70	,91066	—	57,61	153,56	4,05	65,12	,6493
71	,91135	—	58,43	154,35	4,08	64,79	,6460
72	,91202	—	59,26	155,14	4,12	64,46	,6427
73	,91269	—	60,08	155,93	4,15	64,13	,6395
74	,91335	—	60,90	156,72	4,18	63,81	,6363
100 + 75	,91400	—	61,73	157,50	4,23	63,49	,6331
76	,91465	—	62,55	158,29	4,26	63,17	,6299
77	,91528	—	63,37	159,08	4,29	62,86	,6268
78	,91591	—	64,20	159,87	4,33	62,55	,6237
79	,91654	—	65,02	160,66	4,36	62,24	,6206
100 + 80	,91715	—	65,84	161,45	4,39	61,94	,6176
81	,91776	—	66,66	162,24	4,42	61,64	,6146
82	,91835	—	67,49	163,03	4,46	61,34	,6116
83	,91894	—	68,31	163,82	4,49	61,04	,6086
84	,91953	—	69,13	164,61	4,52	60,75	,6057
100 + 85	,92010	—	69,96	165,40	4,56	60,46	,6028
86	,92066	—	70,78	166,19	4,59	60,17	,5999
87	,92121	—	71,61	166,99	4,62	59,89	,5971
88	,92176	—	72,43	167,78	4,65	59,60	,5943
89	,92230	—	73,25	168,58	4,67	59,32	,5915
100 + 90	,92283	—	74,07	169,37	4,70	59,04	,5987
91	,92337	—	74,90	170,16	4,74	58,77	,5860
92	,92390	—	75,72	170,95	4,77	58,50	,5833
93	,92442	—	76,54	171,75	4,79	58,23	,5806
94	,92494	—	77,36	172,54	4,82	57,96	,5779
100 + 95	,92546	—	78,18	173,33	4,85	57,69	,5753
96	,92596	—	79,00	174,11	4,89	57,43	,5727
97	,92646	—	79,82	174,90	4,92	57,17	,5701
98	,92696	—	80,64	175,70	4,94	56,91	,5675
99	,92745	—	81,47	176,50	4,97	56,66	,5649

TABLE II.

HEAT 65°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92794	100	82,30	177,30	5,00	56,40	,5624
99	,92844	—	83,13	178,11	5,01	56,14	,5599
98	,92893	—	83,98	178,93	5,05	55,89	,5574
97	,92942	—	84,84	179,77	5,07	55,63	,5547
96	,92991	—	85,72	180,62	5,10	55,36	,5521
100 + 95	,93040	—	86,63	181,49	5,14	55,10	,5494
94	,93088	—	87,56	182,38	5,18	54,83	,5467
93	,93137	—	88,50	183,29	5,21	54,56	,5440
92	,93186	—	89,46	184,23	5,23	54,28	,5412
91	,93235	—	90,44	185,19	5,25	54,00	,5384
100 + 90	,93285	—	91,45	186,16	5,29	53,72	,5356
89	,93336	—	92,47	187,16	5,31	53,43	,5328
88	,93388	—	93,52	188,18	5,34	53,14	,5299
87	,93440	—	94,60	189,23	5,37	52,84	,5270
86	,93493	—	95,70	190,30	5,40	52,55	,5240
100 + 85	,93546	—	96,83	191,39	5,44	52,25	,5210
84	,93600	—	97,98	192,51	5,47	51,94	,5180
83	,93655	—	99,16	193,66	5,50	51,63	,5149
82	,93710	—	100,37	194,84	5,53	51,32	,5118
81	,93766	—	101,61	196,04	5,57	51,01	,5086
100 + 80	,93822	—	102,88	197,28	5,60	50,69	,5054
79	,93877	—	104,18	198,55	5,63	50,37	,5022
78	,93932	—	105,51	199,85	5,67	50,04	,4989
77	,93987	—	106,88	201,19	5,69	49,70	,4956
76	,94043	—	108,29	202,57	5,72	49,36	,4922
100 + 75	,94099	—	109,73	203,98	5,75	49,02	,4888
74	,94156	—	111,21	205,43	5,78	48,68	,4854
73	,94213	—	112,73	206,92	5,81	48,33	,4819
72	,94271	—	114,30	208,46	5,84	47,97	,4783
71	,94329	—	115,91	210,04	5,87	47,61	,4747
100 + 70	,94388	—	117,57	211,66	5,91	47,25	,4711
69	,94447	—	119,27	213,32	5,95	46,88	,4674
68	,94507	—	121,02	215,04	5,98	46,50	,4637
67	,94567	—	122,83	216,82	6,01	46,12	,4599
66	,94628	—	124,70	218,65	6,05	45,74	,4560
100 + 65	,94689	—	126,62	220,53	6,09	45,35	,4521
64	,94751	—	128,59	222,47	6,12	44,95	,4482
63	,94813	—	130,63	224,48	6,15	44,55	,4442
62	,94875	—	132,74	226,56	6,18	44,14	,4401
61	,94937	—	134,92	228,70	6,22	43,73	,4360
100 + 60	,95000	—	137,17	230,91	6,26	43,31	,4318
59	,95063	—	139,49	233,20	6,29	42,88	,4276
58	,95126	—	141,89	235,57	6,32	42,45	,4233
57	,95190	—	144,38	238,03	6,35	42,01	,4189
56	,95254	—	146,97	240,58	6,39	41,57	,4145
100 + 55	,95318	—	149,64	243,22	6,42	41,11	,4100
54	,95381	—	152,38	245,95	6,43	40,66	,4054
53	,95444	—	155,25	248,80	6,45	40,19	,4008
52	,95507	—	158,24	251,77	6,47	39,72	,3961
51	,95571	—	161,36	254,85	6,51	39,24	,3913

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95635	100	164,61	258,05	6,56	38,75	,3864
49	,95700	—	167,97	261,38	6,59	38,26	,3815
48	,95765	—	171,46	264,86	6,60	37,76	,3765
47	,95830	—	175,11	268,49	6,62	37,25	,3714
46	,95896	—	178,92	272,27	6,65	36,73	,3662
100 + 45	,95902	—	182,90	276,22	6,68	36, 0	,3610
44	,96027	—	187,05	280,25	6,70	35,67	,3557
43	,96092	—	191,40	284,69	6,71	35,12	,3502
42	,96157	—	195,96	289,24	6,72	34,57	,3447
41	,96222	—	200,74	294,01	6,73	34,01	,3392
100 + 40	,96288	—	205,76	299,02	6,74	33,44	,3335
39	,96354	—	211,03	304,29	6,74	32,86	,3277
38	,96420	—	216,59	309,83	6,76	32,28	,3218
37	,96486	—	222,44	315,68	6,76	31,68	,3159
36	,96553	—	228,62	321,85	6,77	31,07	,3098
100 + 35	,96620	—	235,15	328,39	6,76	30,45	,3036
34	,96687	—	242,07	335,32	6,75	29,82	,2974
33	,96754	—	249,40	342,70	6,70	29,18	,2910
32	,96822	—	257,20	350,51	6,69	28,53	,2845
31	,96890	—	265,49	358,81	6,68	27,87	,2779
100 + 30	,96959	—	274,34	367,65	6,69	27,20	,2712
29	,97028	—	283,80	377,13	6,67	26,52	,2644
28	,97097	—	293,94	387,28	6,66	25,82	,2574
27	,97167	—	304,83	398,22	6,61	25,11	,2504
26	,97237	—	316,55	409,97	6,58	24,39	,2432
100 + 25	,97309	—	329,21	422,68	6,53	23,66	,2359
24	,97382	—	342,93	436,45	6,48	22,91	,2285
23	,97456	—	357,84	451,41	6,43	22,15	,2209
22	,97532	—	374,10	467,72	6,38	21,38	,2132
21	,97610	—	391,92	485,60	6,32	20,59	,2053
100 + 20	,97688	—	411,52	505,25	6,27	19,79	,1973
19	,97767	—	433,17	526,99	6,17	18,97	,1892
18	,97848	—	457,24	551,13	6,11	18,14	,1809
17	,97932	—	484,14	578,11	6,03	17,30	,1725
16	,98018	—	514,40	608,46	5,94	16,44	,1639
100 + 15	,98106	—	548,69	642,85	5,84	15,56	,1551
14	,98196	—	587,88	682,16	5,72	14,66	,1462
13	,98290	—	633,10	727,48	5,62	13,75	,1371
12	,98388	—	685,86	780,36	5,50	12,81	,1278
11	,98489	—	748,21	842,84	5,37	11,86	,1183
100 + 10	,98594	—	823,03	917,77	5,26	10,89	,1086
9	,98703	—	914,48	1009,37	5,11	9,91	,0988
8	,98818	—	1028,79	1123,82	4,97	8,90	,0887
7	,98939	—	1175,76	1270,93	4,83	7,87	,0785
6	,99063	—	1371,72	1467,04	4,68	6,82	,0680
100 + 5	,99194	—	1646,00	1741,54	4,52	5,74	,0572
4	,99331	—	2057,58	2153,22	4,36	4,64	,0463
3	,99475	—	2743,44	2839,24	4,20	3,52	,0351
2	,99626	—	4115,15	4211,11	4,04	2,37	,0237
1	,99784	—	8230,31	8326,40	3,91	1,20	,0120

TABLE I. HEAT 66°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82214	100	—	100,00	—	100,00	,9965	100 + 50	,89433	100	41,13	137,89	3,24	72,52	,7227
1	,82440	—	0,82	100,72	0,10	99,29	,9895	51	,89525	—	41,95	138,67	3,28	72,12	,7187
2	,82672	—	1,65	101,44	0,21	98,58	,9825	52	,89613	—	42,78	139,45	3,33	71,71	,7147
3	,82892	—	2,47	102,16	0,31	97,88	,9755	53	,89702	—	43,60	140,22	3,38	71,31	,7107
4	,83107	—	3,29	102,89	0,40	97,19	,9686	54	,89789	—	44,42	141,00	3,42	70,92	,7068
100 + 5	,83315	—	4,11	103,62	0,49	96,51	,9618	100 + 55	,89875	—	45,24	141,78	3,46	70,53	,7028
6	,83519	—	4,94	104,35	0,59	95,84	,9551	56	,89959	—	46,06	142,56	3,50	70,14	,6990
7	,83717	—	5,76	105,08	0,68	95,17	,9484	57	,90042	—	46,88	143,35	3,53	69,76	,6952
8	,83912	—	6,58	105,82	0,76	94,50	,9418	58	,90124	—	47,71	144,13	3,58	69,38	,6914
9	,84102	—	7,41	106,56	0,85	93,85	,9353	59	,90204	—	48,53	144,91	3,62	69,00	,6877
100 + 10	,84286	—	8,23	107,30	0,93	93,20	,9288	100 + 60	,90284	—	49,35	145,70	3,65	68,64	,6840
11	,84465	—	9,05	108,04	1,01	92,56	,9224	61	,90362	—	50,17	146,48	3,69	68,27	,6803
12	,84641	—	9,87	108,79	1,08	91,92	,9160	62	,90439	—	51,00	147,26	3,74	67,90	,6767
13	,84813	—	10,69	109,54	1,15	91,29	,9098	63	,90514	—	51,82	148,05	3,77	67,54	,6731
14	,84981	—	11,51	110,29	1,22	90,67	,9036	64	,90589	—	52,64	148,83	3,81	67,19	,6695
100 + 15	,85145	—	12,34	111,04	1,30	90,05	,8975	100 + 65	,90663	—	53,47	149,62	3,85	66,84	,6660
16	,85307	—	13,16	111,79	1,37	89,45	,8914	66	,90737	—	54,29	150,40	3,89	66,49	,6625
17	,85467	—	13,98	112,55	1,43	88,85	,8854	67	,90809	—	55,11	151,19	3,92	66,14	,6591
18	,85624	—	14,80	113,30	1,50	88,26	,8795	68	,90881	—	55,94	151,97	3,97	65,79	,6557
19	,85778	—	15,63	114,06	1,57	87,67	,8737	69	,90952	—	56,76	152,76	4,00	65,45	,6523
100 + 20	,85928	—	16,45	114,82	1,63	87,09	,8679	100 + 70	,91023	—	57,58	153,55	4,03	65,13	,6490
21	,86076	—	17,27	115,57	1,70	86,52	,8622	71	,91091	—	58,40	154,33	4,07	64,80	,6457
22	,86221	—	18,09	116,33	1,76	85,96	,8566	72	,91159	—	59,23	155,12	4,11	64,46	,6424
23	,86363	—	18,92	117,09	1,83	85,40	,8511	73	,91225	—	60,05	155,91	4,14	64,13	,6392
24	,86502	—	19,74	117,85	1,89	84,85	,8456	74	,91291	—	60,87	156,70	4,17	63,82	,6360
100 + 25	,86639	—	20,57	118,62	1,95	84,30	,8401	100 + 75	,91356	—	61,70	157,48	4,22	63,50	,6328
26	,86774	—	21,39	119,38	2,01	83,76	,8348	76	,91421	—	62,52	158,27	4,25	63,18	,6296
27	,86907	—	22,21	120,14	2,07	83,23	,8295	77	,91484	—	63,34	159,06	4,28	62,87	,6265
28	,87037	—	23,04	120,91	2,13	82,70	,8242	78	,91547	—	64,16	159,85	4,31	62,56	,6234
29	,87165	—	23,86	121,68	2,18	82,18	,8190	79	,91610	—	64,99	160,64	4,35	62,25	,6203
100 + 30	,87291	—	24,68	122,44	2,24	81,67	,8139	100 + 80	,91670	—	65,81	161,43	4,38	61,95	,6173
31	,87415	—	25,50	123,20	2,30	81,17	,8088	81	,91732	—	66,63	162,22	4,41	61,64	,6143
32	,87537	—	26,33	123,97	2,36	80,66	,8038	82	,91791	—	67,45	163,01	4,44	61,34	,6113
33	,87658	—	27,15	124,74	2,41	80,16	,7989	83	,91851	—	68,27	163,80	4,47	61,05	,6083
34	,87776	—	27,97	125,52	2,45	79,67	,7940	84	,91910	—	69,09	164,59	4,50	60,76	,6054
100 + 35	,87892	—	28,80	126,28	2,52	79,18	,7891	100 + 85	,91967	—	69,92	165,39	4,53	60,46	,6026
36	,88006	—	29,61	127,05	2,56	78,70	,7844	86	,92023	—	70,74	166,18	4,56	60,18	,5997
37	,88117	—	30,44	127,82	2,62	78,23	,7796	87	,92078	—	71,57	166,97	4,60	59,89	,5969
38	,88227	—	31,26	128,59	2,67	77,76	,7749	88	,92133	—	72,39	167,76	4,63	59,61	,5941
39	,88336	—	32,08	129,36	2,72	77,30	,7703	89	,92187	—	73,21	168,56	4,65	59,33	,5913
100 + 40	,88443	—	32,90	130,14	2,76	76,84	,7658	100 + 90	,92241	—	74,03	169,35	4,68	59,05	,5985
41	,88549	—	33,72	130,91	2,81	76,38	,7612	91	,92295	—	74,86	170,14	4,72	58,77	,5858
42	,88654	—	34,55	131,68	2,87	75,93	,7568	92	,92347	—	75,68	170,93	4,75	58,50	,5831
43	,88758	—	35,37	132,45	2,92	75,50	,7524	93	,92400	—	76,50	171,72	4,78	58,23	,5804
44	,88860	—	36,19	133,23	2,96	75,06	,7480	94	,92452	—	77,32	172,52	4,80	57,96	,5777
100 + 45	,88959	—	37,02	134,00	3,02	74,62	,7436	100 + 95	,92504	—	78,14	173,31	4,83	57,70	,5750
46	,89058	—	37,84	134,78	3,06	74,19	,7394	96	,92554	—	78,96	174,09	4,87	57,44	,5725
47	,89154	—	38,66	135,56	3,10	73,77	,7352	97	,92604	—	79,78	174,88	4,90	57,18	,5699
48	,89249	—	39,48	136,33	3,15	73,35	,7310	98	,92654	—	80,60	175,67	4,93	56,92	,5673
49	,89342	—	40,31	137,11	3,20	72,93	,7268	99	,92703	—	81,43	176,47	4,96	56,66	,5647

TABLE II.

HEAT 66°.

I. Water and Spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92752	100	82,26	177,27	4,99	56,41	,5621
99	,92801	—	83,09	178,08	5,01	56,15	,5596
98	,92851	—	83,94	178,90	5,04	55,89	,5571
97	,92900	—	84,80	179,74	5,06	55,63	,5544
96	,92949	—	85,68	180,59	5,09	55,37	,5518
100 + 95	,92998	—	86,59	181,46	5,13	55,11	,5492
94	,93046	—	87,51	182,35	5,16	54,83	,5465
93	,93095	—	88,45	183,26	5,19	54,56	,5438
92	,93144	—	89,41	184,20	5,21	54,28	,5410
91	,93194	—	90,39	185,16	5,23	54,00	,5382
100 + 90	,93242	—	91,40	186,13	5,27	53,72	,5354
89	,93295	—	92,42	187,13	5,29	53,43	,5326
88	,93347	—	93,47	188,16	5,31	53,14	,5297
87	,93399	—	94,55	189,20	5,35	52,85	,5268
86	,93452	—	95,65	190,27	5,38	52,56	,5238
100 + 85	,93505	—	96,78	191,36	5,42	52,25	,5207
84	,93559	—	97,93	192,49	5,44	51,95	,5178
83	,93614	—	99,11	193,64	5,47	51,64	,5147
82	,93669	—	100,32	194,82	5,50	51,33	,5116
81	,93725	—	101,56	196,02	5,54	51,02	,5084
100 + 80	,93781	—	102,83	197,25	5,58	50,70	,5052
79	,93836	—	104,13	198,52	5,61	50,37	,5020
78	,93892	—	105,46	199,82	5,64	50,04	,4987
77	,93947	—	106,83	201,16	5,67	49,71	,4954
76	,94003	—	108,24	202,54	5,70	49,37	,4920
100 + 75	,94058	—	109,68	203,95	5,73	49,03	,4886
74	,94116	—	111,15	205,40	5,75	48,69	,4852
73	,94174	—	112,67	206,88	5,79	48,34	,4817
72	,94232	—	114,24	208,43	5,81	47,98	,4782
71	,94290	—	115,85	210,00	5,85	47,62	,4746
100 + 70	,94349	—	117,51	211,62	5,89	47,26	,4709
69	,94409	—	119,21	213,28	5,93	46,89	,4672
68	,94469	—	120,96	215,00	5,96	46,51	,4635
67	,94529	—	122,77	216,78	5,99	46,13	,4597
66	,94590	—	124,64	218,61	6,03	45,75	,4559
100 + 65	,94652	—	126,56	220,49	6,07	45,35	,4520
64	,94714	—	128,53	222,43	6,10	44,95	,4480
63	,94776	—	130,56	224,44	6,12	44,56	,4441
62	,94838	—	132,67	226,51	6,16	44,15	,4400
61	,94900	—	134,85	228,65	6,20	43,74	,4359
100 + 60	,94963	—	137,10	230,86	6,24	43,32	,4317
59	,95026	—	139,42	233,16	6,26	42,89	,4275
58	,95090	—	141,82	235,53	6,29	42,46	,4232
57	,95154	—	144,31	237,98	6,33	42,01	,4188
56	,95218	—	146,90	240,53	6,37	41,57	,4144
100 + 55	,95283	—	149,57	243,17	6,40	41,12	,4098
54	,95340	—	152,30	245,89	6,41	40,67	,4053
53	,95410	—	155,17	248,74	6,43	40,20	,4007
52	,95473	—	158,16	251,72	6,44	39,73	,3960
51	,95538	—	161,28	254,79	6,49	39,24	,3912

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95601	100	164,53	257,99	6,54	38,76	,3863
49	,95667	—	167,89	261,31	6,58	38,27	,3814
48	,95732	—	171,38	264,79	6,59	37,77	,3764
47	,95798	—	175,02	268,42	6,60	37,26	,3713
46	,95864	—	178,83	272,20	6,63	36,73	,3661
100 + 45	,95930	—	182,81	276,16	6,65	36,21	,3609
44	,95996	—	186,96	280,28	6,68	35,67	,3556
43	,96061	—	191,31	284,61	6,70	35,13	,3501
42	,96127	—	195,86	289,16	6,70	34,58	,3446
41	,96193	—	200,64	293,93	6,71	34,02	,3391
100 + 40	,96259	—	205,66	298,94	6,72	33,45	,3334
39	,96325	—	210,93	304,20	6,73	32,87	,3276
38	,96392	—	216,48	309,74	6,74	32,28	,3217
37	,96459	—	222,33	315,59	6,74	31,68	,3158
36	,96526	—	228,51	321,76	6,75	31,07	,3097
100 + 35	,96593	—	235,04	328,29	6,75	30,46	,3035
34	,96661	—	241,95	335,21	6,74	29,83	,2973
33	,96728	—	249,28	342,59	6,69	29,19	,2909
32	,96797	—	257,07	350,40	6,67	28,54	,2844
31	,96865	—	265,36	358,69	6,67	27,88	,2778
100 + 30	,96935	—	274,21	367,53	6,68	27,21	,2711
29	,97004	—	283,66	377,00	6,66	26,52	,2643
28	,97074	—	293,80	387,15	6,65	25,83	,2574
27	,97145	—	304,68	398,09	6,59	25,12	,2504
26	,97216	—	316,40	409,83	6,57	24,40	,2432
100 + 25	,97288	—	329,05	422,52	6,53	23,67	,2359
24	,97362	—	342,76	436,28	6,48	22,92	,2285
23	,97436	—	357,67	451,24	6,43	22,16	,2209
22	,97513	—	373,92	467,54	6,38	21,39	,2132
21	,97591	—	391,73	485,41	6,32	20,60	,2053
100 + 20	,97670	—	411,32	505,05	6,27	19,80	,1973
19	,97750	—	432,96	526,78	6,18	18,98	,1892
18	,97831	—	457,02	550,90	6,12	18,15	,1809
17	,97916	—	483,91	577,87	6,04	17,31	,1725
16	,98002	—	514,15	608,20	5,95	16,45	,1639
100 + 15	,98091	—	548,43	642,57	5,86	15,57	,1551
14	,98181	—	587,60	681,86	5,74	14,67	,1462
13	,98276	—	632,80	727,16	5,64	13,75	,1371
12	,98374	—	685,53	780,01	5,52	12,82	,1278
11	,98476	—	747,85	842,46	5,39	11,87	,1183
100 + 10	,98580	—	822,64	917,36	5,28	10,90	,1086
9	,98690	—	914,05	1008,91	5,14	9,91	,0988
8	,98806	—	1028,30	1123,31	4,99	8,90	,0887
7	,98927	—	1175,20	1270,35	4,85	7,87	,0784
6	,99051	—	1371,07	1466,36	4,71	6,82	,0680
100 + 5	,99182	—	1645,28	1740,73	4,55	5,74	,0572
4	,99320	—	2056,61	2152,21	4,40	4,65	,0463
3	,99464	—	2742,15	2837,91	4,24	3,52	,0351
2	,99615	—	4113,21	4209,13	4,08	2,38	,0237
1	,99773	—	8226,42	8322,48	3,94	1,20	,0120

TABLE I. HEAT 67°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82167	100	—	100,00	—	100,00	,9959	100 + 50	,89387	100	41,11	137,88	3,23	72,53	,7223
1	,82399	—	0,82	100,72	0,10	99,29	,9889	51	,89480	—	41,93	138,66	3,27	72,12	,7183
2	,82625	—	1,65	101,44	0,21	98,58	,9819	52	,89568	—	42,76	139,44	3,32	71,71	,7143
3	,82845	—	2,47	102,16	0,31	97,88	,9750	53	,89657	—	43,58	140,21	3,37	71,31	,7103
4	,83059	—	3,29	102,89	0,40	97,20	,9681	54	,89744	—	44,40	140,99	3,41	70,92	,7004
100 + 5	,83268	—	4,11	103,62	0,49	96,51	,9612	100 + 55	,89830	—	45,22	141,77	3,45	70,53	,7025
6	,83471	—	4,94	104,35	0,59	95,84	,9546	56	,89914	—	46,04	142,55	3,49	70,14	,6987
7	,83669	—	5,76	105,08	0,68	95,17	,9479	57	,89997	—	46,86	143,34	3,52	69,76	,6949
8	,83864	—	6,58	105,82	0,76	94,50	,9413	58	,90079	—	47,69	144,12	3,57	69,38	,6911
9	,84054	—	7,40	106,56	0,84	93,85	,9347	59	,90160	—	48,51	144,90	3,61	69,01	,6874
100 + 10	,84237	—	8,22	107,30	0,92	93,20	,9282	100 + 60	,90239	—	49,33	145,68	3,65	68,64	,6836
11	,84417	—	9,04	108,04	1,00	92,56	,9219	61	,90317	—	50,15	146,47	3,68	68,27	,6800
12	,84593	—	9,87	108,79	1,08	91,92	,9155	62	,90394	—	50,98	147,25	3,73	67,91	,6763
13	,84765	—	10,69	109,54	1,15	91,29	,9093	63	,90470	—	51,80	148,04	3,76	67,55	,6727
14	,84932	—	11,50	110,29	1,21	90,67	,9031	64	,90545	—	52,62	148,82	3,80	67,19	,6692
100 + 15	,85096	—	12,33	111,04	1,29	90,06	,8970	100 + 65	,90619	—	53,45	149,61	3,84	66,84	,6657
16	,85259	—	13,16	111,79	1,37	89,45	,8909	66	,90693	—	54,27	150,39	3,88	66,49	,6622
17	,85419	—	13,98	112,55	1,43	88,85	,8849	67	,90765	—	55,09	151,18	3,91	66,14	,6588
18	,85576	—	14,80	113,30	1,50	88,26	,8790	68	,90837	—	55,91	151,96	3,95	65,80	,6554
19	,85730	—	15,62	114,05	1,57	87,67	,8732	69	,90909	—	56,73	152,75	3,98	65,46	,6520
100 + 20	,85880	—	16,44	114,81	1,63	87,10	,8674	100 + 70	,90978	—	57,55	153,53	4,02	65,13	,6487
21	,86028	—	17,26	115,57	1,69	86,53	,8617	71	,91048	—	58,37	154,31	4,06	64,80	,6454
22	,86174	—	18,09	116,32	1,77	85,96	,8562	72	,91116	—	59,20	155,11	4,09	64,47	,6421
23	,86316	—	18,91	117,08	1,83	85,40	,8506	73	,91181	—	60,02	155,90	4,12	64,14	,6389
24	,86455	—	19,73	117,85	1,88	84,85	,8451	74	,91248	—	60,84	156,69	4,15	63,82	,6357
100 + 25	,86592	—	20,56	118,61	1,95	84,30	,8397	100 + 75	,91312	—	61,67	157,47	4,20	63,50	,6325
26	,86727	—	21,38	119,37	2,01	83,77	,8343	76	,91377	—	62,49	158,26	4,23	63,19	,6293
27	,86860	—	22,20	120,14	2,06	83,24	,8290	77	,91440	—	63,31	159,05	4,26	62,87	,6262
28	,86991	—	23,03	120,90	2,13	82,71	,8238	78	,91503	—	64,13	159,83	4,30	62,56	,6231
29	,87119	—	23,85	121,67	2,18	82,19	,8186	79	,91566	—	64,96	160,63	4,33	62,25	,6200
100 + 30	,87245	—	24,67	122,44	2,23	81,68	,8135	100 + 80	,91625	—	65,78	161,42	4,36	61,95	,6170
31	,87369	—	25,49	123,20	2,29	81,17	,8083	81	,91688	—	66,60	162,21	4,39	61,65	,6140
32	,87490	—	26,31	123,97	2,34	80,67	,8033	82	,91747	—	67,42	162,99	4,43	61,35	,6110
33	,87612	—	27,14	124,74	2,40	80,17	,7985	83	,91807	—	68,24	163,78	4,46	61,06	,6080
34	,87729	—	27,96	125,51	2,45	79,68	,7936	84	,91866	—	69,06	164,58	4,48	60,76	,6051
100 + 35	,87845	—	28,78	126,27	2,51	79,19	,7887	100 + 85	,91924	—	69,89	165,37	4,52	60,47	,6023
36	,87959	—	29,59	127,04	2,55	78,71	,7840	86	,91980	—	70,71	166,16	4,55	60,18	,5994
37	,88070	—	30,42	127,82	2,60	78,24	,7792	87	,92035	—	71,53	166,95	4,58	59,90	,5966
38	,88180	—	31,24	128,59	2,65	77,77	,7745	88	,92090	—	72,36	167,74	4,62	59,62	,5938
39	,88289	—	32,07	129,36	2,71	77,31	,7699	89	,92144	—	73,18	168,54	4,64	59,34	,5910
100 + 40	,88395	—	32,89	130,13	2,76	76,84	,7654	100 + 90	,92198	—	74,00	169,33	4,67	59,06	,5882
41	,88502	—	33,71	130,90	2,81	76,39	,7608	91	,92252	—	74,83	170,12	4,71	58,78	,5855
42	,88607	—	34,54	131,67	2,87	75,94	,7564	92	,92304	—	75,65	170,91	4,74	58,51	,5828
43	,88711	—	35,36	132,45	2,91	75,50	,7520	93	,92358	—	76,47	171,70	4,77	58,24	,5801
44	,88813	—	36,18	133,22	2,96	75,06	,7476	94	,92410	—	77,29	172,50	4,79	57,97	,5774
100 + 45	,88912	—	37,00	133,99	3,01	74,63	,7433	100 + 95	,92462	—	78,10	173,29	4,81	57,71	,5747
46	,89012	—	37,82	134,77	3,05	74,20	,7390	96	,92512	—	78,92	174,07	4,85	57,45	,5722
47	,89106	—	38,64	135,55	3,09	73,77	,7348	97	,92562	—	79,74	174,86	4,88	57,19	,5696
48	,89203	—	39,46	136,32	3,14	73,35	,7306	98	,92611	—	80,56	175,65	4,91	56,93	,5670
49	,89297	—	40,29	137,10	3,19	72,94	,7265	99	,92660	—	81,39	176,45	4,94	56,67	,5644

TABLE II. HEAT 67°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92709	100	82,22	177,25	4,97	56,42	,5619	100 + 50	,95568	100	164,45	257,93	6,52	38,77	,3861
99	,92758	—	83,05	178,06	4,99	56,16	,5594	49	,95634	—	167,81	261,25	6,56	38,28	,3812
98	,92808	—	83,90	178,88	5,02	55,90	,5568	48	,95699	—	171,30	264,72	6,58	37,77	,3762
97	,92857	—	84,77	179,72	5,05	55,64	,5542	47	,95765	—	174,94	268,35	6,59	37,26	,3711
96	,92906	—	85,64	180,57	5,07	55,38	,5516	46	,95831	—	178,74	272,13	6,61	36,74	,3660
100 + 95	,92956	—	86,55	181,44	5,11	55,12	,5489	100 + 45	,95898	—	182,72	276,09	6,63	36,22	,3608
94	,93004	—	87,47	182,33	5,14	54,84	,5462	44	,95964	—	186,87	280,21	6,66	35,68	,3555
93	,93053	—	88,41	183,24	5,17	54,57	,5435	43	,96031	—	191,22	284,54	6,68	35,14	,3500
92	,93102	—	89,37	184,18	5,19	54,29	,5407	42	,96097	—	195,77	289,09	6,68	34,59	,3445
91	,93152	—	90,35	185,14	5,21	54,01	,5379	41	,96163	—	200,55	293,85	6,70	34,03	,3390
100 + 90	,93200	—	91,36	186,10	5,26	53,73	,5351	100 + 40	,96230	—	205,56	298,85	6,71	33,46	,3333
89	,93253	—	92,38	187,11	5,27	53,44	,5323	39	,96297	—	210,83	304,11	6,72	32,88	,3275
88	,93305	—	93,43	188,13	5,30	53,15	,5294	38	,96364	—	216,38	309,65	6,73	32,29	,3216
87	,93357	—	94,51	189,18	5,33	52,86	,5265	37	,96431	—	222,23	315,50	6,73	31,69	,3157
86	,93410	—	95,61	190,25	5,36	52,56	,5235	36	,96498	—	228,40	321,67	6,73	31,08	,3096
100 + 85	,93463	—	96,74	191,34	5,40	52,26	,5205	100 + 35	,96566	—	234,93	328,19	6,74	30,47	,3035
84	,93517	—	97,89	192,46	5,43	51,96	,5175	34	,96634	—	241,84	335,11	6,73	29,84	,2972
83	,93572	—	99,06	193,61	5,45	51,65	,5144	33	,96702	—	249,16	342,48	6,68	29,20	,2908
82	,93627	—	100,27	194,79	5,48	51,34	,5113	32	,96771	—	256,95	350,28	6,67	28,55	,2843
81	,93683	—	101,51	195,99	5,52	51,02	,5082	31	,96840	—	265,23	358,58	6,65	27,89	,2777
100 + 80	,93740	—	102,78	197,22	5,56	50,70	,5050	100 + 30	,96911	—	274,08	367,41	6,67	27,22	,2711
79	,93795	—	104,08	198,49	5,59	50,38	,5018	29	,96980	—	283,53	376,87	6,66	26,53	,2643
78	,93851	—	105,41	199,79	5,62	50,05	,4985	28	,97050	—	293,66	387,03	6,63	25,84	,2573
77	,93906	—	106,78	201,13	5,65	49,72	,4952	27	,97122	—	304,54	397,96	6,58	25,13	,2503
76	,93962	—	108,19	202,51	5,68	49,38	,4918	26	,97194	—	316,25	409,69	6,56	24,41	,2431
100 + 75	,94018	—	109,63	203,92	5,71	49,04	,4884	100 + 25	,97266	—	328,89	422,37	6,52	23,68	,2358
74	,94076	—	111,10	205,37	5,73	48,70	,4850	24	,97341	—	342,60	436,12	6,48	22,93	,2284
73	,94134	—	112,62	206,85	5,77	48,34	,4815	23	,97416	—	357,50	451,07	6,43	22,17	,2208
72	,94192	—	114,19	208,39	5,80	47,99	,4780	22	,97493	—	373,74	467,36	6,38	21,39	,2131
71	,94251	—	115,80	209,97	5,83	47,63	,4744	21	,97572	—	391,55	485,22	6,32	20,61	,2052
100 + 70	,94310	—	117,46	211,59	5,87	47,27	,4707	100 + 20	,97652	—	411,12	504,85	6,27	19,80	,1973
69	,94370	—	119,15	213,25	5,90	46,89	,4670	19	,97732	—	432,76	526,57	6,19	18,99	,1892
68	,94430	—	120,90	214,97	5,93	46,51	,4633	18	,97814	—	456,80	550,67	6,13	18,16	,1808
67	,94491	—	122,71	216,75	5,96	46,14	,4595	17	,97899	—	483,68	577,63	6,05	17,31	,1724
66	,94552	—	124,58	218,57	6,01	45,76	,4557	16	,97986	—	513,91	607,94	5,97	16,45	,1638
100 + 65	,94614	—	126,50	220,45	6,05	45,37	,4518	100 + 15	,98076	—	548,17	642,30	5,87	15,57	,1551
64	,94676	—	128,47	222,39	6,08	44,97	,4478	14	,98166	—	587,32	681,57	5,75	14,67	,1462
63	,94738	—	130,50	224,40	6,10	44,56	,4439	13	,98261	—	632,50	726,84	5,64	13,76	,1370
62	,94800	—	132,61	226,47	6,14	44,15	,4398	12	,98360	—	685,21	779,67	5,54	12,82	,1277
61	,94862	—	134,78	228,61	6,17	43,75	,4357	11	,98462	—	747,50	842,08	5,42	11,87	,1183
100 + 60	,94925	—	137,03	230,82	6,21	43,33	,4315	100 + 10	,98566	—	822,25	916,95	5,30	10,90	,1086
59	,94989	—	139,36	233,11	6,25	42,90	,4273	9	,98677	—	913,62	1008,46	5,16	9,91	,0988
58	,95053	—	141,75	235,48	6,27	42,46	,4230	8	,98793	—	1027,81	1122,80	5,01	8,91	,0887
57	,95117	—	144,24	237,93	6,31	42,02	,4186	7	,98914	—	1174,65	1269,77	4,88	7,88	,0784
56	,95182	—	146,83	240,48	6,35	41,58	,4142	6	,99039	—	1370,42	1465,69	4,73	6,82	,0679
100 + 55	,95247	—	149,50	243,12	6,38	41,13	,4096	100 + 5	,99170	—	1644,51	1739,93	4,58	5,74	,0572
54	,95311	—	152,23	245,84	6,39	40,67	,4051	4	,99308	—	2055,63	2151,21	4,42	4,65	,0463
53	,95375	—	155,09	248,68	6,41	40,21	,4005	3	,99453	—	2740,85	2836,58	4,27	3,53	,0351
52	,95439	—	158,09	251,66	6,43	39,73	,3958	2	,99604	—	4111,27	4207,16	4,11	2,38	,0237
51	,95504	—	161,21	254,73	6,48	39,25	,3910	1	,99762	—	8221,55	8318,57	3,98	1,20	,0120

TABLE I. HEAT 68°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82119	100	—	100,00	—	100,00	,9954	100 + 50	,89342	100	41,09	137,87	3,22	72,53	,7220
1	,82351	—	0,82	100,72	0,10	99,29	,9883	51	,89434	—	41,91	138,65	3,26	72,13	,7180
2	,82577	—	1,64	101,44	0,20	98,58	,9813	52	,89523	—	42,74	139,43	3,31	71,72	,7140
3	,82797	—	2,47	102,16	0,31	97,88	,9744	53	,89612	—	43,56	140,20	3,36	71,32	,7099
4	,83011	—	3,29	102,89	0,40	97,20	,9676	54	,89699	—	44,38	140,98	3,40	70,93	,7060
100 + 5	,83221	—	4,11	103,62	0,49	96,51	,9607	100 + 55	,89785	—	45,20	141,76	3,44	70,54	,7021
6	,83423	—	4,94	104,35	0,59	95,84	,9540	56	,89869	—	46,02	142,54	3,48	70,15	,6983
7	,83621	—	5,76	105,08	0,68	95,17	,9474	57	,89952	—	46,84	143,33	3,51	69,77	,6945
8	,83816	—	6,58	105,82	0,76	94,50	,9408	58	,90034	—	47,66	144,11	3,55	69,39	,6908
9	,84006	—	7,40	106,56	0,84	93,85	,9343	59	,90115	—	48,48	144,89	3,59	69,02	,6871
100 + 10	,84189	—	8,22	107,30	0,92	93,20	,9277	100 + 60	,90194	—	49,31	145,67	3,64	68,65	,6833
11	,84369	—	9,04	108,04	1,00	92,56	,9214	61	,90272	—	50,13	146,46	3,67	68,28	,6796
12	,84544	—	9,86	108,79	1,07	91,92	,9150	62	,90349	—	50,95	147,24	3,71	67,91	,6760
13	,84716	—	10,68	109,54	1,14	91,29	,9088	63	,90425	—	51,77	148,02	3,75	67,55	,6724
14	,84884	—	11,50	110,29	1,21	90,67	,9026	64	,90500	—	52,59	148,81	3,78	67,20	,6689
100 + 15	,85048	—	12,33	111,04	1,29	90,06	,8965	100 + 65	,90574	—	53,42	149,59	3,83	66,85	,6654
16	,85211	—	13,15	111,79	1,36	89,45	,8904	66	,90648	—	54,24	150,37	3,87	66,50	,6619
17	,85371	—	13,97	112,55	1,42	88,86	,8844	67	,90721	—	55,06	151,16	3,90	66,15	,6585
18	,85528	—	14,79	113,30	1,49	88,26	,8785	68	,90793	—	55,88	151,94	3,94	65,81	,6551
19	,85682	—	15,61	114,05	1,56	87,68	,8727	69	,90865	—	56,70	152,73	3,97	65,47	,6517
100 + 20	,85832	—	16,43	114,81	1,62	87,10	,8670	100 + 70	,90934	—	57,53	153,52	4,01	65,14	,6484
21	,85980	—	17,25	115,57	1,68	86,53	,8613	71	,91004	—	58,35	154,30	4,05	64,81	,6451
22	,86126	—	18,08	116,32	1,76	85,97	,8557	72	,91072	—	59,17	155,09	4,08	64,48	,6418
23	,86269	—	18,90	117,08	1,82	85,41	,8502	73	,91138	—	59,99	155,88	4,11	64,15	,6386
24	,86408	—	19,72	117,84	1,88	84,85	,8446	74	,91204	—	60,81	156,67	4,14	63,83	,6354
100 + 25	,86545	—	20,55	118,61	1,94	84,31	,8392	100 + 75	,91268	—	61,64	157,45	4,19	63,51	,6322
26	,86680	—	21,37	119,37	2,00	83,77	,8338	76	,91332	—	62,46	158,24	4,22	63,19	,6290
27	,86813	—	22,19	120,13	2,06	83,24	,8285	77	,91396	—	63,28	159,03	4,25	62,88	,6259
28	,86944	—	23,02	120,90	2,12	82,71	,8234	78	,91459	—	64,10	159,82	4,28	62,57	,6228
29	,87073	—	23,84	121,66	2,18	82,19	,8182	79	,91521	—	64,93	160,61	4,32	62,26	,6197
100 + 30	,87198	—	24,66	122,43	2,23	81,68	,8130	100 + 80	,91581	—	65,75	161,40	4,35	61,96	,6167
31	,87323	—	25,47	123,19	2,28	81,17	,8079	81	,91643	—	66,57	162,19	4,38	61,66	,6137
32	,87444	—	26,30	123,96	2,34	80,67	,8029	82	,91703	—	67,39	162,97	4,42	61,36	,6107
33	,87565	—	27,12	124,73	2,39	80,17	,7981	83	,91763	—	68,21	163,77	4,44	61,06	,6077
34	,87683	—	27,94	125,50	2,44	79,68	,7932	84	,91822	—	69,03	164,56	4,47	60,77	,6048
100 + 35	,87799	—	28,77	126,27	2,50	79,19	,7883	100 + 85	,91881	—	69,85	165,35	4,50	60,48	,6020
36	,87912	—	29,58	127,04	2,54	78,71	,7836	86	,91937	—	70,67	166,14	4,53	60,19	,5991
37	,88023	—	30,41	127,81	2,60	78,24	,7788	87	,91992	—	71,50	166,93	4,57	59,91	,5963
38	,88133	—	31,23	128,58	2,65	77,77	,7741	88	,92047	—	72,32	167,72	4,60	59,62	,5935
39	,88242	—	32,05	129,35	2,70	77,31	,7695	89	,92101	—	73,14	168,52	4,62	59,34	,5907
100 + 40	,88348	—	32,87	130,13	2,74	76,85	,7650	100 + 90	,92155	—	73,96	169,31	4,65	59,06	,5879
41	,88455	—	33,69	130,89	2,80	76,39	,7604	91	,92209	—	74,79	170,10	4,69	58,79	,5852
42	,88560	—	34,52	131,67	2,85	75,94	,7560	92	,92262	—	75,61	170,89	4,72	58,52	,5825
43	,88664	—	35,34	132,44	2,90	75,50	,7516	93	,92315	—	76,43	171,68	4,75	58,25	,5798
44	,88766	—	36,16	133,21	2,95	75,06	,7472	94	,92367	—	77,25	172,48	4,77	57,98	,5772
100 + 45	,88866	—	36,99	133,99	3,00	74,63	,7429	100 + 95	,92419	—	78,07	173,27	4,80	57,71	,5745
46	,88966	—	37,80	134,76	3,04	74,20	,7386	96	,92469	—	78,88	174,05	4,83	57,45	,5719
47	,89062	—	38,62	135,54	3,08	73,78	,7344	97	,92519	—	79,70	174,84	4,86	57,19	,5693
48	,89157	—	39,44	136,31	3,13	73,36	,7303	98	,92568	—	80,52	175,63	4,89	56,93	,5667
49	,89251	—	40,27	137,09	3,18	72,94	,7261	99	,92617	—	81,35	176,43	4,92	56,67	,5642

TABLE II. HEAT 63°.

I. Water and spirit by weight.	II. Specific gravity.	III Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92666	100	82,18	177,23	4,95	56,42	,5616	100 + 50	,95535	100	164,37	257,87	6,50	38,78	,3860
99	,92715	—	83,01	178,04	4,97	56,17	,5591	49	,95601	—	167,73	261,19	6,54	38,29	,3811
98	,92765	—	83,86	178,86	5,00	55,91	,5566	48	,95667	—	171,22	264,66	6,56	37,78	,3761
97	,92814	—	84,73	179,69	5,04	55,64	,5539	47	,95733	—	174,86	268,28	6,58	37,27	,3710
96	,92864	—	85,60	180,54	5,06	55,38	,5513	46	,95799	—	178,66	272,06	6,60	36,75	,3659
100 + 95	,92913	—	86,51	181,41	5,10	55,12	,5487	100 + 45	,95866	—	182,64	276,02	6,62	36,23	,3606
94	,92962	—	87,43	182,30	5,13	54,85	,5460	44	,95933	—	186,78	280,14	6,64	35,69	,3553
93	,93011	—	88,37	183,22	5,15	54,58	,5433	43	,96000	—	191,13	284,47	6,66	35,15	,3499
92	,93060	—	89,33	184,15	5,18	54,30	,5405	42	,96067	—	195,68	289,01	6,67	34,60	,3444
91	,93110	—	90,31	185,11	5,20	54,02	,5377	41	,96133	—	200,46	293,77	6,69	34,04	,3389
100 + 90	,93158	—	91,31	186,08	5,23	53,74	,5349	100 + 40	,96201	—	205,46	298,77	6,69	33,47	,3332
89	,93211	—	92,33	187,09	5,24	53,45	,5321	39	,96268	—	210,73	304,03	6,70	32,89	,3274
88	,93263	—	93,39	188,11	5,28	53,16	,5292	38	,96336	—	216,28	309,56	6,72	32,30	,3216
87	,93315	—	94,46	189,15	5,31	52,87	,5263	37	,96403	—	222,12	315,41	6,71	31,70	,3156
86	,93368	—	95,56	190,22	5,34	52,57	,5233	36	,96470	—	228,29	321,58	6,71	31,09	,3095
100 + 85	,93421	—	96,69	191,31	5,38	52,27	,5203	100 + 35	,96539	—	234,82	328,09	6,73	30,48	,3034
84	,93475	—	97,84	192,43	5,41	51,97	,5173	34	,96607	—	241,72	335,01	6,71	29,85	,2971
83	,93530	—	99,01	193,58	5,43	51,66	,5142	33	,96676	—	249,04	342,37	6,67	29,21	,2908
82	,93586	—	100,22	194,76	5,46	51,34	,5111	32	,96745	—	256,83	350,17	6,66	28,56	,2843
81	,93642	—	101,46	195,96	5,50	51,03	,5080	31	,96815	—	265,11	358,46	6,65	27,90	,2777
100 + 80	,93698	—	102,73	197,19	5,54	50,71	,5048	100 + 30	,96886	—	273,95	367,29	6,66	27,23	,2710
79	,93754	—	104,03	198,46	5,57	50,39	,5016	29	,96956	—	283,40	376,75	6,65	26,54	,2642
78	,93810	—	105,36	199,76	5,60	50,06	,4983	28	,97027	—	293,52	386,91	6,61	25,85	,2573
77	,93865	—	106,73	201,10	5,63	49,72	,4950	27	,97099	—	304,39	397,83	6,56	25,14	,2502
76	,93922	—	108,14	202,48	5,66	49,38	,4916	26	,97172	—	316,10	409,56	6,54	24,42	,2430
100 + 75	,93978	—	109,58	203,89	5,69	49,04	,4882	100 + 25	,97245	—	328,74	422,22	6,52	23,69	,2357
74	,94036	—	111,05	205,34	5,71	48,70	,4848	24	,97320	—	342,44	435,96	6,48	22,94	,2283
73	,94094	—	112,57	206,82	5,75	48,35	,4813	23	,97396	—	357,33	450,90	6,43	22,18	,2208
72	,94153	—	114,14	208,36	5,78	47,99	,4778	22	,97474	—	373,57	467,18	6,39	21,40	,2131
71	,94212	—	115,75	209,94	5,81	47,64	,4742	21	,97553	—	391,36	485,03	6,33	20,61	,2052
100 + 70	,94271	—	117,40	211,55	5,85	47,27	,4705	100 + 20	,97634	—	410,93	504,65	6,28	19,81	,1972
69	,94331	—	119,10	213,21	5,89	46,90	,4668	19	,97714	—	432,56	526,36	6,20	19,00	,1891
68	,94392	—	120,84	214,93	5,91	46,52	,4631	18	,97797	—	456,59	550,45	6,14	18,17	,1808
67	,94453	—	122,65	216,71	5,94	46,15	,4593	17	,97882	—	483,45	577,39	6,06	17,32	,1724
66	,94514	—	124,52	218,53	5,99	45,76	,4555	16	,97970	—	513,67	607,69	5,98	16,46	,1638
100 + 65	,94576	—	126,44	220,41	6,03	45,37	,4516	100 + 15	,98060	—	547,91	642,03	5,88	15,58	,1550
64	,94638	—	128,41	222,35	6,06	44,97	,4477	14	,98151	—	587,04	681,28	5,76	14,68	,1461
63	,94700	—	130,44	224,35	6,09	44,57	,4437	13	,98246	—	632,20	726,53	5,67	13,76	,1370
62	,94762	—	132,54	226,43	6,11	44,16	,4396	12	,98346	—	684,89	779,33	5,56	12,83	,1277
61	,94825	—	134,72	228,56	6,16	43,75	,4355	11	,98448	—	747,15	841,71	5,44	11,88	,1183
100 + 60	,94888	—	136,97	230,77	6,20	43,34	,4313	100 + 10	,98553	—	821,86	916,54	5,32	10,91	,1086
59	,94952	—	139,29	233,07	6,22	42,91	,4271	9	,98664	—	913,19	1008,01	5,18	9,92	,0987
58	,95016	—	141,68	235,44	6,24	42,47	,4228	8	,98780	—	1027,33	1122,29	5,04	8,91	,0887
57	,95080	—	144,17	237,88	6,29	42,03	,4184	7	,98901	—	1174,10	1269,19	4,91	7,88	,0784
56	,95146	—	146,76	240,43	6,33	41,59	,4140	6	,99027	—	1369,78	1465,02	4,76	6,83	,0679
100 + 55	,95211	—	149,43	243,07	6,36	41,14	,4095	100 + 5	,99158	—	1643,74	1739,13	4,61	5,75	,0572
54	,95276	—	152,16	245,79	6,37	40,68	,4049	4	,99296	—	2054,67	2150,23	4,44	4,65	,0463
53	,95340	—	155,02	248,63	6,39	40,21	,4003	3	,99441	—	2739,56	2835,26	4,30	3,53	,0351
52	,95405	—	158,01	251,60	6,41	39,74	,3956	2	,99593	—	4109,34	4205,19	4,15	2,38	,0237
51	,95470	—	161,13	254,67	6,46	39,26	,3908	1	,99751	—	8218,68	8314,68	4,00	1,20	,0120

TABLE I. HEAT 69°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82071	100	—	100,00	—	100,00	,9948	100 + 50	,89297	100	41,07	137,86	3,21	72,54	,7216
1	,82303	—	0,82	100,72	0,10	99,29	,9877	51	,89389	—	41,89	138,64	3,25	72,13	,7176
2	,82529	—	1,64	101,44	0,20	98,58	,9807	52	,89478	—	42,72	139,42	3,30	71,72	,7136
3	,82749	—	2,46	102,16	0,30	97,89	,9738	53	,89567	—	43,54	140,19	3,35	71,32	,7096
4	,82963	—	3,28	102,88	0,40	97,20	,9670	54	,89654	—	44,36	140,97	3,39	70,93	,7057
100 + 5	,83173	—	4,11	103,62	0,49	96,51	,9601	100 + 55	,89740	—	45,18	141,75	3,43	70,54	,7018
6	,83375	—	4,93	104,34	0,59	95,84	,9534	56	,89824	—	46,00	142,53	3,47	70,15	,6980
7	,83573	—	5,75	105,08	0,67	95,17	,9468	57	,89907	—	46,82	143,32	3,50	69,77	,6942
8	,83768	—	6,58	105,82	0,76	94,51	,9402	58	,89989	—	47,64	144,10	3,54	69,39	,6904
9	,83957	—	7,40	106,55	0,85	93,85	,9337	59	,90070	—	48,46	144,88	3,58	69,02	,6867
100 + 10	,84141	—	8,22	107,29	0,93	93,20	,9272	100 + 60	,90149	—	49,29	145,66	3,63	68,66	,6829
11	,84320	—	9,03	108,04	0,99	92,56	,9208	61	,90227	—	50,11	146,45	3,66	68,29	,6793
12	,84495	—	9,86	108,79	1,07	91,93	,9145	62	,90304	—	50,93	147,23	3,70	67,92	,6756
13	,84666	—	10,68	109,54	1,14	91,30	,9083	63	,90380	—	51,75	148,01	3,74	67,56	,6720
14	,84835	—	11,49	110,28	1,21	90,68	,9021	64	,90455	—	52,57	148,80	3,77	67,20	,6685
100 + 15	,84999	—	12,32	111,04	1,28	90,06	,8960	100 + 65	,90529	—	53,39	149,58	3,81	66,85	,6650
16	,85163	—	13,15	111,79	1,36	89,46	,8899	66	,90603	—	54,21	150,36	3,85	66,50	,6616
17	,85323	—	13,96	112,54	1,42	88,86	,8839	67	,90677	—	55,03	151,15	3,88	66,15	,6582
18	,85480	—	14,78	113,29	1,49	88,27	,8780	68	,90749	—	55,85	151,93	3,92	65,81	,6548
19	,85634	—	15,61	114,05	1,56	87,68	,8722	69	,90821	—	56,67	152,71	3,96	65,48	,6514
100 + 20	,85784	—	16,42	114,81	1,61	87,10	,8665	100 + 70	,90890	—	57,50	153,51	3,99	65,14	,6481
21	,85932	—	17,24	115,56	1,68	86,55	,8608	71	,90960	—	58,32	154,28	4,04	64,81	,6448
22	,86078	—	18,07	116,31	1,76	85,97	,8552	72	,91028	—	59,14	155,07	4,07	64,48	,6415
23	,86221	—	18,89	117,07	1,82	85,41	,8497	73	,91094	—	59,96	155,86	4,10	64,15	,6383
24	,86361	—	19,71	117,84	1,87	84,86	,8442	74	,91160	—	60,78	156,66	4,12	63,83	,6351
100 + 25	,86498	—	20,54	118,60	1,94	84,31	,8388	100 + 75	,91224	—	61,61	157,44	4,17	63,51	,6319
26	,86633	—	21,36	119,36	2,00	83,78	,8334	76	,91288	—	62,43	158,23	4,20	63,20	,6287
27	,86766	—	22,18	120,13	2,05	83,25	,8281	77	,91352	—	63,25	159,01	4,24	62,88	,6256
28	,86897	—	23,00	120,89	2,11	82,72	,8229	78	,91415	—	64,07	159,80	4,27	62,57	,6225
29	,87026	—	23,83	121,66	2,17	82,20	,8177	79	,91477	—	64,90	160,59	4,31	62,26	,6194
100 + 30	,87151	—	24,64	122,42	2,22	81,69	,8126	100 + 80	,91537	—	65,72	161,38	4,34	61,96	,6164
31	,87276	—	25,46	123,19	2,27	81,18	,8075	81	,91599	—	66,54	162,17	4,37	61,66	,6134
32	,87398	—	26,28	123,96	2,32	80,68	,8025	82	,91659	—	67,36	162,95	4,41	61,36	,6104
33	,87518	—	27,11	124,73	2,38	80,18	,7976	83	,91719	—	68,18	163,75	4,43	61,07	,6074
34	,87636	—	27,93	125,50	2,43	79,68	,7927	84	,91778	—	69,00	164,54	4,46	60,77	,6045
100 + 35	,87752	—	28,75	126,26	2,49	79,19	,7879	100 + 85	,91837	—	69,82	165,33	4,49	60,48	,6017
36	,87865	—	29,57	127,03	2,54	78,71	,7832	86	,91894	—	70,64	166,12	4,52	60,20	,5988
37	,87976	—	30,39	127,80	2,59	78,24	,7784	87	,91949	—	71,46	166,91	4,55	59,91	,5960
38	,88086	—	31,21	128,58	2,63	77,77	,7737	88	,92004	—	72,29	167,70	4,59	59,63	,5932
39	,88195	—	32,04	129,35	2,69	77,31	,7691	89	,92058	—	73,11	168,50	4,61	59,35	,5904
100 + 40	,88301	—	32,86	130,12	2,74	76,85	,7646	100 + 90	,92112	—	73,93	169,29	4,64	59,07	,5876
41	,88408	—	33,68	130,89	2,79	76,39	,7600	91	,92166	—	74,75	170,08	4,67	58,79	,5849
42	,88513	—	34,51	131,66	2,85	75,95	,7556	92	,92219	—	75,57	170,87	4,70	58,52	,5822
43	,88617	—	35,33	132,43	2,90	75,51	,7512	93	,92272	—	76,39	171,66	4,73	58,25	,5795
44	,88719	—	36,15	133,21	2,94	75,07	,7468	94	,92324	—	77,22	172,46	4,76	57,98	,5769
100 + 45	,88818	—	36,97	133,98	2,99	74,64	,7425	100 + 95	,92376	—	78,03	173,25	4,78	57,72	,5742
46	,88919	—	37,78	134,76	3,02	74,21	,7382	96	,92426	—	78,84	174,03	4,81	57,46	,5716
47	,89016	—	38,60	135,53	3,07	73,78	,7340	97	,92476	—	79,66	174,82	4,84	57,20	,5691
48	,89111	—	39,42	136,30	3,12	73,36	,7299	98	,92525	—	80,48	175,61	4,87	56,94	,5665
49	,89205	—	40,25	137,08	3,17	72,95	,7257	99	,92574	—	81,31	176,41	4,90	56,68	,5639

TABLE II. HEAT 69°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92623	100	82,14	177,21	4,93	56,43	,5613
99	,92672	—	82,97	178,02	4,95	56,17	,5588
98	,92722	—	83,82	178,84	4,98	55,91	,5563
97	,92772	—	84,69	179,67	5,02	55,65	,5537
96	,92822	—	85,57	180,52	5,05	55,39	,5511
100 + 95	,92870	—	86,47	181,39	5,08	55,13	,5484
94	,92920	—	87,39	182,28	5,11	54,86	,5457
93	,92969	—	88,33	183,20	5,13	54,58	,5430
92	,93018	—	89,29	184,13	5,16	54,31	,5402
91	,93068	—	90,27	185,08	5,19	54,03	,5374
100 + 90	,93116	—	91,27	186,06	5,21	53,74	,5346
89	,93169	—	92,29	187,06	5,23	53,46	,5318
88	,93221	—	93,34	188,09	5,25	53,17	,5290
87	,93273	—	94,42	189,12	5,30	52,87	,5260
86	,93326	—	95,51	190,19	5,32	52,58	,5230
100 + 85	,93379	—	96,64	191,28	5,36	52,28	,5200
84	,93434	—	97,79	192,40	5,39	51,98	,5170
83	,93489	—	98,96	193,55	5,41	51,67	,5140
82	,93545	—	100,17	194,73	5,44	51,35	,5109
81	,93601	—	101,41	195,93	5,48	51,04	,5078
100 + 80	,93657	—	102,68	197,16	5,52	50,72	,5046
79	,93713	—	103,98	198,43	5,55	50,39	,5013
78	,93769	—	105,31	199,73	5,58	50,06	,4981
77	,93825	—	106,68	201,07	5,61	49,73	,4948
76	,93882	—	108,09	202,45	5,64	49,39	,4914
100 + 75	,93938	—	109,53	203,86	5,67	49,05	,4880
74	,93996	—	111,00	205,31	5,69	48,71	,4846
73	,94055	—	112,52	206,79	5,73	48,36	,4811
72	,94114	—	114,09	208,32	5,77	48,00	,4776
71	,94173	—	115,70	209,90	5,80	47,64	,4740
100 + 70	,94232	—	117,35	211,51	5,84	47,28	,4703
69	,94293	—	119,04	213,17	5,87	46,91	,4666
68	,94354	—	120,79	214,90	5,89	46,53	,4629
67	,94415	—	122,60	216,67	5,93	46,16	,4591
66	,94476	—	124,46	218,49	5,97	45,77	,4553
100 + 65	,94538	—	126,38	220,37	6,01	45,38	,4514
64	,94600	—	128,35	222,31	6,04	44,98	,4475
63	,94662	—	130,38	224,31	6,07	44,58	,4435
62	,94725	—	132,48	226,38	6,10	44,17	,4394
61	,94788	—	134,66	228,52	6,14	43,76	,4353
100 + 60	,94851	—	136,91	230,74	6,17	43,34	,4311
59	,94915	—	139,22	233,02	6,20	42,91	,4269
58	,94979	—	141,62	235,39	6,23	42,48	,4226
57	,95043	—	144,11	237,84	6,27	42,04	,4183
56	,95110	—	146,69	240,38	6,31	41,60	,4138
100 + 55	,95175	—	149,36	243,02	6,34	41,15	,4093
54	,95241	—	152,09	245,74	6,35	40,69	,4048
53	,95305	—	154,95	248,58	6,37	40,22	,4002
52	,95371	—	157,94	251,54	6,40	39,75	,3955
51	,95437	—	161,05	254,61	6,44	39,27	,3907

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95502	100	164,29	257,81	6,48	38,79	,3859
49	,95568	—	167,65	261,13	6,52	38,30	,3810
48	,95634	—	171,14	264,60	6,54	37,79	,3760
47	,95701	—	174,78	268,21	6,57	37,28	,3709
46	,95767	—	178,58	271,99	6,59	36,76	,3658
100 + 45	,95834	—	182,56	275,95	6,61	36,24	,3605
44	,95902	—	186,69	280,07	6,62	35,70	,3552
43	,95969	—	191,04	284,40	6,64	35,16	,3498
42	,96037	—	195,59	288,94	6,65	34,61	,3443
41	,96104	—	200,36	293,69	6,67	34,05	,3387
100 + 40	,96172	—	205,36	298,69	6,67	33,48	,3330
39	,96240	—	210,63	303,94	6,69	32,90	,3273
38	,96308	—	216,18	309,48	6,70	32,31	,3215
37	,96375	—	222,02	315,32	6,70	31,71	,3155
36	,96443	—	228,18	321,49	6,69	31,10	,3094
100 + 35	,96511	—	234,71	327,99	6,72	30,49	,3033
34	,96580	—	241,61	334,91	6,70	29,86	,2970
33	,96650	—	248,93	342,26	6,67	29,22	,2907
32	,96720	—	256,71	350,05	6,66	28,57	,2842
31	,96790	—	264,99	358,35	6,64	27,91	,2776
100 + 30	,96861	—	273,82	367,17	6,65	27,24	,2709
29	,96932	—	283,27	376,63	6,64	26,55	,2641
28	,97004	—	293,38	386,79	6,59	25,86	,2572
27	,97077	—	304,25	397,70	6,55	25,15	,2502
26	,97150	—	315,95	409,43	6,52	24,43	,2430
100 + 25	,97224	—	328,59	422,07	6,52	23,70	,2357
24	,97300	—	342,28	435,80	6,48	22,95	,2283
23	,97376	—	357,16	450,73	6,43	22,19	,2207
22	,97455	—	373,40	467,00	6,40	21,41	,2130
21	,97534	—	391,18	484,84	6,34	20,62	,2052
100 + 20	,97615	—	410,74	504,45	6,29	19,82	,1972
19	,97696	—	432,36	526,15	6,21	19,01	,1890
18	,97780	—	456,38	550,23	6,15	18,17	,1807
17	,97865	—	483,22	577,15	6,07	17,33	,1723
16	,97954	—	513,43	607,44	5,99	16,46	,1637
100 + 15	,98044	—	547,65	641,76	5,89	15,58	,1550
14	,98136	—	586,77	680,99	5,78	14,68	,1461
13	,98232	—	631,90	726,22	5,68	13,77	,1370
12	,98332	—	684,57	778,99	5,58	12,84	,1277
11	,98434	—	746,80	841,34	5,46	11,88	,1182
100 + 10	,98540	—	821,48	916,13	5,35	10,91	,1086
9	,98651	—	912,76	1007,56	5,20	9,92	,0987
8	,98767	—	1026,85	1121,78	5,07	8,91	,0887
7	,98889	—	1173,55	1268,61	4,94	7,88	,0784
6	,99015	—	1369,14	1464,35	4,79	6,83	,0679
100 + 5	,99146	—	1642,97	1738,33	4,64	5,75	,0572
4	,99284	—	2053,70	2149,23	4,47	4,65	,0463
3	,99429	—	2738,28	2833,95	4,33	3,53	,0351
2	,99581	—	4107,42	4203,24	4,18	2,38	,0237
1	,99740	—	8214,83	8310,80	4,03	1,20	,0120

TABLE I. HEAT 70°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,82023	100	—	100,00	—	100,00	,9942	100 + 50	,89252	100	41,05	137,85	3,20	72,54	,7212
1	,82255	—	0,82	100,72	0,10	99,29	,9871	51	,89343	—	41,88	138,63	3,25	72,14	,7172
2	,82481	—	1,64	101,44	0,20	98,58	,9801	52	,89433	—	42,70	139,41	3,29	71,73	,7132
3	,82701	—	2,46	102,16	0,30	97,89	,9732	53	,89522	—	43,52	140.18	3,34	71,33	,7092
4	,82915	—	3,28	102,88	0,40	97,20	,9664	54	,89609	—	44,34	140.96	3,38	70,94	,7053
100 + 5	,83124	—	4,10	103,61	0,49	96,52	,9596	100 + 55	,89695	—	45,16	141,74	3,42	70,55	,7014
6	,83327	—	4,93	104,34	0,59	95,84	,9529	56	,89779	—	45,98	142,52	3,46	70,16	,6976
7	,83525	—	5,75	105,08	0,67	95,17	,9462	57	,89862	—	46,80	143,31	3,49	69,78	,6938
8	,83719	—	6,57	105,81	0,76	94,51	,9396	58	,89944	—	47,62	144,09	3,53	69,40	,6900
9	,83908	—	7,39	106,55	0,84	93,85	,9331	59	,90025	—	48,44	144,87	3,57	69,03	,6863
100 + 10	,84092	—	8,21	107,29	0,92	93,20	,9266	100 + 60	,90104	—	49,27	145,65	3,62	68,66	,6826
11	,84271	—	9,03	108,04	0,99	92,56	,9202	61	,90182	—	50,09	146,44	3,65	68,29	,6789
12	,84446	—	9,85	108,78	1,07	91,93	,9139	62	,90259	—	50,91	147,22	3,69	67,92	,6753
13	,84618	—	10,67	109,54	1,13	91,30	,9077	63	,90335	—	51,73	148,00	3,73	67,56	,6717
14	,84786	—	11,49	110,28	1,21	90,68	,9015	64	,90410	—	52,55	148,79	3,76	67,21	,6682
100 + 15	,84951	—	12,32	111,04	1,28	90,06	,8954	100 + 65	,90484	—	53,37	149.57	3,80	66,86	,6647
16	,85114	—	13,14	111,79	1,35	89,46	,8894	66	,90558	—	54,19	150,35	3,84	66,51	,6612
17	,85274	—	13,96	112,54	1,42	88,86	,8834	67	,90632	—	55,01	151,14	3,87	66,16	,6578
18	,85431	—	14,78	113,29	1,49	88,27	,8775	68	,90705	—	55,83	151.92	3,91	65,82	,6544
19	,85585	—	15,60	114.04	1,56	87,68	,8717	69	,90777	—	56,65	152,70	3,95	65,49	,6510
100 + 20	,85736	—	16,42	114.80	1,62	87,11	,8660	100 + 70	,90847	—	57.48	153.49	3,99	65,15	,6477
21	,85884	—	17,24	115,56	1,68	86,54	,8603	71	,90916	—	58,30	154.27	4,03	64,82	,6444
22	,86030	—	18,06	116,31	1,75	85,97	,8547	72	,90984	—	59,12	155,06	4,06	64,49	,6411
23	,86173	—	18,88	117,07	1,81	85,41	,8492	73	,91050	—	59,94	155,85	4,09	64,16	,6379
24	,86313	—	19,71	117,83	1,88	84,86	,8437	74	,91116	—	60,76	156,64	4,12	63,84	,6347
100 + 25	,86451	—	20,53	118,60	1,93	84,32	,8383	100 + 75	,91181	—	61.58	157,42	4,16	63,52	,6316
26	,86586	—	21,35	119,36	1,99	83,78	,8330	76	,91245	—	62,40	158,21	4,19	63,21	,6284
27	,86719	—	22,17	120,12	2,05	83,25	,8277	77	,91308	—	63,22	159,00	4,22	62,89	,6253
28	,86850	—	22,99	120,89	2,10	82,72	,8225	78	,91370	—	64,04	159,79	4,25	62,58	,6222
29	,86979	—	23,81	121,65	2,16	82,20	,8173	79	,91432	—	64,87	160,58	4,29	62,27	,6191
100 + 30	,87105	—	24,63	122,41	2,22	81,69	,8122	100 + 80	,91493	—	65,69	161,37	4,32	61,97	,6161
31	,87229	—	25,45	123,18	2,27	81,18	,8071	81	,91554	—	66,51	162,16	4,35	61,67	,6131
32	,87351	—	26,27	123,95	2,32	80,68	,8021	82	,91615	—	67,33	162,94	4,39	61,37	,6101
33	,87471	—	27,10	124,72	2,38	80,18	,7972	83	,91675	—	68,15	163,73	4,42	61,08	,6072
34	,87589	—	27,92	125,49	2,43	79,69	,7923	84	,91734	—	68,97	164,52	4,45	60,78	,6043
100 + 35	,87705	—	28,74	126,25	2,49	79,20	,7875	100 + 85	,91793	—	69,79	165,31	4,48	60,49	,6014
36	,87818	—	29,56	127,02	2,54	78,72	,7827	86	,91850	—	70,61	166,10	4,51	60,20	,5985
37	,87929	—	30,38	127,80	2,58	78,25	,7780	87	,91906	—	71,43	166,89	4,54	59,92	,5957
38	,88039	—	31,20	128,57	2,63	77,78	,7733	88	,91961	—	72,26	167,68	4,58	59,64	,5929
39	,88147	—	32,02	129,34	2,68	77,32	,7687	89	,92015	—	73,08	168,48	4,60	59,36	,5901
100 + 40	,88254	—	32,84	130,11	2,73	76,86	,7641	100 + 90	,92069	—	73,90	169,27	4,63	59,08	,5874
41	,88361	—	33,66	130,88	2,78	76,40	,7596	91	,92123	—	74,72	170,06	4,66	58,80	,5846
42	,88466	—	34,49	131,65	2,84	75,95	,7551	92	,92176	—	75,54	170,85	4,69	58,53	,5819
43	,88570	—	35,31	132,43	2,88	75,51	,7507	93	,92229	—	76,36	171,64	4 72	58,26	,5792
44	,88672	—	36,13	133,20	2,93	75,07	,7464	94	,92281	—	77,18	172.44	4,74	57,99	,5766
100 + 45	,88773	—	36,95	133,97	2,98	74,64	,7421	100 + 95	,92333	—	78,00	173,23	4,77	57,73	,5739
46	,88872	—	37,77	134,75	3,02	74,21	,7378	96	,92383	—	78,81	174,01	4,80	57,47	,5713
47	,88969	—	38,59	135,52	3,07	73,79	,7336	97	,92433	—	79,63	174,80	4,83	57,21	,5688
48	,89065	—	39,41	136,30	3,11	73,37	,7295	98	,92482	—	80,45	175,59	4,86	56,95	,5662
49	,89159	—	40,23	137,07	3,16	72,95	,7253	99	,92531	—	81,28	176,39	4,89	56,69	,5636

TABLE II. HEAT 70°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92580	100	82,11	177,19	4,92	56,44	,5611	100 + 50	,95469	100	164,22	257,75	6,47	38,80	,3857
99	,92629	—	82,94	178,00	4,94	56,18	,5585	49	,95535	—	167,57	261,07	6,50	38,30	,3808
98	,92679	—	83,79	178,82	4,97	55,92	,5560	48	,95601	—	171,06	264,53	6,53	37,80	,3758
97	,92729	—	84,66	179,65	5,01	55,66	,5534	47	,95668	—	174,70	268,15	6,55	37,29	,3707
96	,92779	—	85,54	180,50	5,04	55,40	,5508	46	,95735	—	178,50	271,93	6,57	36,77	,3656
100 + 95	,92828	—	86,43	181,37	5,06	55,14	,5482	100 + 45	,95802	—	182,47	275,88	6,59	36,25	,3604
94	,92877	—	87,35	182,26	5,09	54,86	,5455	44	,95870	—	186,61	280,00	6,61	35,71	,3551
93	,92926	—	88,29	183,18	5,11	54,59	,5428	43	,95938	—	190,95	284,33	6,62	35,17	,3497
92	,92976	—	89,25	184,11	5,14	54,31	,5400	42	,96006	—	195,50	288,87	6,63	34,62	,3442
91	,93026	—	90,23	185,06	5,17	54,03	,5372	41	,96074	—	200,27	293,62	6,65	34,06	,3386
100 + 90	,93076	—	91,23	186,04	5,19	53,75	,5344	100 + 40	,96143	—	205,27	298,60	6,67	33,49	,3330
89	,93127	—	92,25	187,04	5,21	53,46	,5316	39	,96211	—	210,54	303,86	6,68	32,91	,3272
88	,93179	—	93,30	188,06	5,24	53,17	,5287	38	,96279	—	216,08	309,40	6,68	32,32	,3214
87	,93231	—	94,37	189,10	5,27	52,88	,5258	37	,96347	—	221,92	315,24	6,68	31,72	,3154
86	,93284	—	95,47	190,17	5,30	52,58	,5228	36	,96415	—	228,08	321,41	6,67	31,11	,3094
100 + 85	,93337	—	96,60	191,26	5,30	52,28	,5198	100 + 35	,96484	—	234,60	327,90	6,70	30,50	,3032
84	,93392	—	97,75	192,37	5,38	51,98	,5168	34	,96553	—	241,50	334,81	6,69	29,87	,2969
83	,93447	—	98,92	193,52	5,40	51,67	,5137	33	,96623	—	248,82	342,15	6,67	29,23	,2906
82	,93503	—	100,13	194,70	5,43	51,36	,5106	32	,96694	—	256,59	349,94	6,65	28,58	,2841
81	,93559	—	101,37	195,90	5,47	51,04	,5075	31	,96765	—	264,87	358,23	6,64	27,91	,2775
100 + 80	,93616	—	102,64	197,13	5,51	50,73	,5043	100 + 30	,96836	—	273,70	367,05	6,65	27,24	,2709
79	,93672	—	103,94	198,40	5,54	50,40	,5011	29	,96908	—	283,14	376,51	6,63	26,56	,2641
78	,93728	—	105,27	199,70	5,57	50,07	,4978	28	,96980	—	293,25	386,67	6,58	25,86	,2571
77	,93784	—	106,64	201,04	5,60	49,74	,4945	27	,97054	—	304,21	397,57	6,54	25,15	,2501
76	,93841	—	108,04	202,42	5,62	49,40	,4912	26	,97128	—	315,81	409,30	6,51	24,43	,2429
100 + 75	,93898	—	109,48	203,83	5,65	49,06	,4878	100 + 25	,97203	—	328,44	421,92	6,52	23,70	,2356
74	,93956	—	110,95	205,28	5,67	48,72	,4844	24	,97279	—	342,12	435,64	6,48	22,95	,2282
73	,94015	—	112,47	206,76	5,71	48,37	,4809	23	,97356	—	357,00	450,56	6,44	22,19	,2207
72	,94074	—	114,04	208,29	5,75	48,01	,4774	22	,97435	—	373,23	466,83	6,40	21,42	,2130
71	,94133	—	115,65	209,86	5,79	47,65	,4738	21	,97515	—	390,00	484,65	6,35	20,63	,2051
100 + 70	,94193	—	117,30	211,48	5,82	47,29	,4701	100 + 20	,97596	—	410,55	504,26	6,29	19,83	,1971
69	,94254	—	118,99	213,14	5,85	46,92	,4664	19	,97678	—	432,16	525,93	6,23	19,01	,1890
68	,94315	—	120,74	214,86	5,88	46,54	,4627	18	,97762	—	456,17	550,01	6,16	18,18	,1807
67	,94376	—	122,55	216,63	5,92	46,16	,4589	17	,97848	—	483,00	576,92	6,08	17,33	,1723
66	,94438	—	124,40	218,45	5,95	45,78	,4551	16	,97937	—	513,19	607,19	6,00	16,47	,1637
100 + 65	,94500	—	126,32	220,33	5,99	45,39	,4512	100 + 15	,98028	—	547,40	641,49	5,91	15,59	,1550
64	,94562	—	128,29	222,27	6,02	44,99	,4473	14	,98121	—	586,50	680,70	5,80	14,69	,1461
63	,94624	—	130,32	224,27	6,05	44,59	,4433	13	,98217	—	631,61	725,91	5,70	13,77	,1370
62	,94687	—	132,42	226,34	6,08	44,18	,4393	12	,98317	—	684,25	778,65	5,60	12,84	,1277
61	,94750	—	134,60	228,48	6,12	43,77	,4352	11	,98420	—	746,45	840,97	5,48	11,89	,1182
100 + 60	,94813	—	136,85	230,69	6,16	43,35	,4310	100 + 10	,98527	—	821,10	915,72	5,38	10,92	,1086
59	,94877	—	139,16	232,97	6,19	42,92	,4268	9	,98638	—	912,33	1007,11	5,22	9,93	,0987
58	,94942	—	141,56	235,34	6,22	42,49	,4225	8	,98754	—	1026,37	1121,28	5,09	8,92	,0887
57	,95007	—	144,05	237,80	6,25	42,05	,4181	7	,98876	—	1173,00	1268,04	4,96	7,89	,0784
56	,95073	—	146,63	240,34	6,29	41,61	,4137	6	,99002	—	1368,50	1463,68	4,82	6,83	,0679
100 + 55	,95139	—	149,29	242,97	6,32	41,16	,4092	100 + 5	,99134	—	1642,20	1737,53	4,67	5,75	,0572
54	,95205	—	152,02	245,69	6,33	40,70	,4046	4	,99272	—	2052,74	2148,24	4,50	4,65	,0463
53	,95270	—	154,88	248,53	6,35	40,23	,4000	3	,99417	—	2737,00	2832,64	4,36	3,53	,0351
52	,95336	—	157,87	251,48	6,39	39,76	,3953	2	,99569	—	4105,50	4201,29	4,21	2,38	,0237
51	,95403	—	160,98	254,56	6,42	39,28	,3905	1	,99728	—	8210,99	8306,93	4,06	1,20	,0120

TABLE I. HEAT 71°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,81975	100	—	100,00	—	100,00	,9936
1	,82206	—	0,82	100,72	0,10	99,29	,9866
2	,82432	—	1,64	101,44	0,20	98,58	,9796
3	,82652	—	2,46	102,16	0,30	97,89	,9727
4	,82866	—	3,28	102,88	0,40	97,20	,9659
100 + 5	,83075	—	4,10	103,61	0,49	96,52	,9590
6	,83278	—	4,93	104,34	0,59	95,84	,9523
7	,83477	—	5,75	105,08	0,67	95,17	,9457
8	,83671	—	6,57	105,81	0,76	94,51	,9391
9	,83860	—	7,39	106,55	0,84	93,85	,9326
100 + 10	,84044	—	8,21	107,29	0,92	93,20	,9261
11	,84223	—	9,03	108,04	0,99	92,56	,9197
12	,84398	—	9,85	108,78	1,07	91,93	,9134
13	,84570	—	10,67	109,53	1,14	91,30	,9072
14	,84738	—	11,48	110,28	1,20	90,68	,9010
100 + 15	,84903	—	12,31	111,03	1,28	90,06	,8949
16	,85066	—	13,14	111,78	1,36	89,46	,8889
17	,85226	—	13,95	112,53	1,42	88,86	,8830
18	,85383	—	14,77	113,29	1,48	88,27	,8771
19	,85537	—	15,59	114,04	1,55	87,68	,8713
100 + 20	,85688	—	16,41	114,80	1,61	87,11	,8655
21	,85836	—	17,23	115,56	1,67	86,54	,8598
22	,85982	—	18,05	116,31	1,74	85,97	,8542
23	,86125	—	18,87	117,07	1,80	85,42	,8488
24	,86265	—	19,70	117,83	1,87	84,87	,8433
100 + 25	,86403	—	20,52	118,59	1,93	84,32	,8379
26	,86539	—	21,34	119,35	1,99	83,78	,8325
27	,86672	—	22,16	120,12	2,04	83,25	,8272
28	,86802	—	22,98	120,88	2,10	82,72	,8220
29	,86931	—	23,80	121,65	2,15	82,20	,8168
100 + 30	,87057	—	24,62	122,41	2,21	81,69	,8117
31	,87181	—	25,44	123,18	2,26	81,18	,8067
32	,87303	—	26,26	123,94	2,32	80,68	,8017
33	,87423	—	27,09	124,71	2,38	80,18	,7968
34	,87541	—	27,91	125,49	2,42	79,69	,7919
100 + 35	,87658	—	28,73	126,25	2,48	79,20	,7870
36	,87771	—	29,55	127,02	2,53	78,72	,7823
37	,87882	—	30,37	127,79	2,58	78,25	,7776
38	,87992	—	31,19	128,56	2,63	77,78	,7719
39	,88100	—	32,01	129,33	2,68	77,32	,7683
100 + 40	,88206	—	32,83	130,10	2,73	76,86	,7637
41	,88314	—	33,65	130,87	2,78	76,40	,7592
42	,88419	—	34,47	131,64	2,83	75,96	,7547
43	,88523	—	35,29	132,42	2,87	75,52	,7503
44	,88625	—	36,11	133,19	2,92	75,08	,7460
100 + 45	,88726	—	36,93	133,96	2,97	74,65	,7417
46	,88825	—	37,75	134,74	3,01	74,22	,7375
47	,88922	—	38,57	135,51	3,06	73,79	,7332
48	,89018	—	39,39	136,29	3,10	73,37	,7291
49	,89113	—	40,21	137,06	3,15	72,96	,7249

I. Spirit and Water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of Spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,89206	100	41,03	137,84	3,19	72,55	,7208
51	,89297	—	41,86	138,62	3,24	72,14	,7169
52	,89387	—	42,68	139,40	3,28	71,74	,7129
53	,89476	—	43,50	140,17	3,33	71,34	,7089
54	,89563	—	44,31	140,95	3,36	70,95	,7050
100 + 55	,89649	—	45,13	141,73	3,40	70,50	,7011
56	,89733	—	45,95	142,51	3,44	70,17	,6973
57	,89816	—	46,77	143,29	3,48	69,79	,6935
58	,89898	—	47,59	144,07	3,52	69,40	,6897
59	,89979	—	48,41	144,85	3,56	69,03	,6859
100 + 60	,90058	—	49,24	145,63	3,61	68,66	,6822
61	,90136	—	50,06	146,42	3,64	68,30	,6786
62	,90213	—	50,88	147,20	3,68	67,93	,6750
63	,90289	—	51,70	147,98	3,72	67,57	,6714
64	,90364	—	52,52	148,77	3,75	67,21	,6679
100 + 65	,90438	—	53,34	149,55	3,79	66,86	,6644
66	,90512	—	54,16	150,33	3,83	66,52	,6609
67	,90586	—	54,98	151,12	3,86	66,17	,6575
68	,90659	—	55,80	151,90	3,90	65,83	,6541
69	,90731	—	56,62	152,68	3,94	65,49	,6507
100 + 70	,90801	—	57,45	153,47	3,98	65,15	,6474
71	,90870	—	58,27	154,26	4,01	64,82	,6441
72	,90938	—	59,09	155,05	4,04	64,49	,6408
73	,91005	—	59,91	155,83	4,08	64,17	,6376
74	,91071	—	60,73	156,62	4,11	63,85	,6344
100 + 75	,91135	—	61,55	157,41	4,14	63,53	,6312
76	,91200	—	62,37	158,19	4,18	63,21	,6281
77	,91263	—	63,19	158,98	4,21	62,90	,6250
78	,91325	—	64,01	159,77	4,24	62,59	,6219
79	,91388	—	64,83	160,56	4,27	62,28	,6188
100 + 80	,91449	—	65,65	161,35	4,30	61,98	,6158
81	,91510	—	66,47	162,14	4,33	61,67	,6128
82	,91571	—	67,29	162,92	4,37	61,38	,6099
83	,91631	—	68,11	163,71	4,40	61,08	,6070
84	,91690	—	68,93	164,50	4,43	60,79	,6040
100 + 85	,91749	—	69,75	165,30	4,45	60,50	,6011
86	,91806	—	70,57	166,09	4,48	60,21	,5983
87	,91862	—	71,39	166,88	4,51	59,92	,5954
88	,91917	—	72,22	167,67	4,55	59,64	,5927
89	,91971	—	73,04	168,46	4,58	59,36	,5899
100 + 90	,92025	—	73,86	169,25	4,61	59,08	,5871
91	,92079	—	74,68	170,04	4,64	58,81	,5844
92	,92132	—	75,50	170,83	4,67	58,54	,5817
93	,92185	—	76,32	171,63	4,69	58,27	,5790
94	,92237	—	77,14	172,42	4,72	58,00	,5764
100 + 95	,92289	—	77,96	173,21	4,75	57,73	,5737
96	,92339	—	78,77	173,99	4,78	57,47	,5711
97	,92389	—	79,59	174,78	4,81	57,21	,5686
98	,92439	—	80,41	175,57	4,84	56,95	,5660
99	,92488	—	81,24	176,37	4,87	56,70	,5634

TABLE II. HEAT 71°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92536	100	82,07	177,17	4,90	56,44	,5608	100 + 50	,95433	100	164,13	257,70	6,43	38,81	,3856
99	,92586	—	82,90	177,97	4,93	56,18	,5583	49	,95501	—	167,49	261,01	6,48	38,31	,3807
98	,92636	—	83,75	178,79	4,96	55,92	,5557	48	,95567	—	170,98	264,47	6,51	37,81	,3757
97	,92686	—	84,62	179,62	5,00	55,66	,5531	47	,95635	—	174,61	268,09	6,52	37,30	,3706
96	,92736	—	85,50	180,47	5,03	55,40	,5506	46	,95702	—	178,41	271,86	6,55	36,78	,3655
100 + 95	,92785	—	86,39	181,34	5,05	55,14	,5479	100 + 45	,95770	—	182,38	275,81	6,57	36,25	,3603
94	,92835	—	87,30	182,23	5,07	54,87	,5453	44	,95838	—	186,52	279,93	6,59	35,72	,3550
93	,92884	—	88,24	183,15	5,09	54,60	,5426	43	,95906	—	190,86	284,25	6,61	35,17	,3496
92	,92934	—	89,20	184,08	5,12	54,32	,5398	42	,95975	—	195,41	288,79	6,62	34,62	,3441
91	,92984	—	90,18	185,03	5,15	54,04	,5370	41	,96043	—	200,17	293,54	6,63	34,06	,3385
100 + 90	,93033	—	91,18	186,01	5,17	53,76	,5342	100 + 40	,96111	—	205,17	298,52	6,65	33,49	,3329
89	,93085	—	92,20	187,01	5,19	53,47	,5314	39	,96181	—	210,44	303,77	6,67	32,92	,3271
88	,93138	—	93,25	188,03	5,22	53,18	,5285	38	,96249	—	215,97	309,31	6,66	32,33	,3213
87	,93190	—	94,32	189,08	5,24	52,89	,5256	37	,96318	—	221,81	315,15	6,66	31,73	,3153
86	,93243	—	95,42	190,14	5,28	52,59	,5226	36	,96387	—	227,97	321,31	6,66	31,12	,3093
100 + 85	,93296	—	96,55	191,23	5,32	52,29	,5196	100 + 35	,96456	—	234,49	327,80	6,69	30,51	,3031
84	,93351	—	97,70	192,35	5,35	51,99	,5166	34	,96526	—	241,38	334,70	6,68	29,87	,2969
83	,93406	—	98,87	193,50	5,37	51,68	,5135	33	,96596	—	248,70	342,04	6,66	29,23	,2905
82	,93462	—	100,08	194,67	5,41	51,37	,5104	32	,96668	—	256,47	349,83	6,64	28,58	,2840
81	,93518	—	101,32	195,87	5,45	51,05	,5073	31	,96739	—	264,74	358,11	6,63	27,92	,2774
100 + 80	,93576	—	102,59	197,10	5,49	50,73	,5041	100 + 30	,96811	—	273,57	366,92	6,65	27,25	,2708
79	,93632	—	103,89	198,36	5,53	50,41	,5009	29	,96883	—	283,00	376,38	6,62	26,57	,2640
78	,93688	—	105,22	199,67	5,55	50,08	,4976	28	,96956	—	293,11	386,54	6,57	25,87	,2571
77	,93744	—	106,59	201,01	5,58	49,75	,4943	27	,97030	—	303,96	397,43	6,53	25,16	,2501
76	,93801	—	107,99	202,39	5,60	49,41	,4910	26	,97105	—	315,66	409,15	6,51	24,44	,2429
100 + 75	,93857	—	109,43	203,80	5,63	49,07	,4876	100 + 25	,97180	—	328,28	421,77	6,52	23,71	,2356
74	,93916	—	110,90	205,24	5,66	48,72	,4842	24	,97257	—	341,96	435,48	6,48	22,96	,2282
73	,93975	—	112,41	206,72	5,69	48,37	,4807	23	,97334	—	356,83	450,39	6,44	22,20	,2207
72	,94034	—	113,98	208,25	5,73	48,01	,4772	22	,97414	—	373,05	466,65	6,40	21,43	,2130
71	,94093	—	115,59	209,82	5,77	47,66	,4736	21	,97495	—	390,81	484,46	6,35	20,64	,2051
100 + 70	,94153	—	117,24	211,44	5,80	47,29	,4699	100 + 20	,97575	—	410,36	504,06	6,30	19,84	,1971
69	,94214	—	118,93	213,10	5,83	46,92	,4662	19	,97659	—	431,95	525,72	6,23	19,02	,1890
68	,94275	—	120,68	214,82	5,86	46,55	,4625	18	,97744	—	455,95	549,79	6,16	18,19	,1807
67	,94336	—	122,49	216,60	5,89	46,17	,4588	17	,97831	—	482,77	576,68	6,09	17,34	,1723
66	,94398	—	124,34	218,41	5,93	45,79	,4550	16	,97920	—	512,95	606,93	6,02	16,48	,1637
100 + 65	,94461	—	126,26	220,29	5,97	45,39	,4511	100 + 15	,98011	—	547,14	641,22	5,92	15,60	,1550
64	,94523	—	128,23	222,23	6,00	44,99	,4472	14	,98105	—	586,22	680,41	5,81	14,70	,1461
63	,94585	—	130,26	224,23	6,03	44,59	,4432	13	,98201	—	631,31	725,59	5,72	13,78	,1370
62	,94649	—	132,36	226,30	6,06	44,19	,4391	12	,98302	—	683,93	778,31	5,62	12,85	,1277
61	,94712	—	134,53	228,43	6,10	43,78	,4350	11	,98405	—	746,10	840,60	5,50	11,89	,1182
100 + 60	,94775	—	136,78	230,64	6,14	43,36	,4308	100 + 10	,98513	—	820,71	915,31	5,40	10,92	,1086
59	,94840	—	139,09	232,93	6,16	42,93	,4266	9	,98624	—	911,90	1006,65	5,25	9,93	,0987
58	,94905	—	141,49	235,30	6,19	42,50	,4224	8	,98740	—	1025,89	1120,77	5,12	8,92	,0887
57	,94971	—	143,98	237,75	6,23	42,06	,4180	7	,98862	—	1173,46	1267,46	5,00	7,89	,0784
56	,95037	—	146,56	240,29	6,27	41,61	,4136	6	,99089	—	1367,86	1463,01	4,85	6,84	,0679
100 + 55	,95102	—	149,21	242,91	6,30	41,17	,4091	100 + 5	,99121	—	1641,43	1736,73	4,70	5,76	,0572
54	,95169	—	151,95	245,63	6,32	40,71	,4045	4	,99259	—	2051,79	2147,26	4,53	4,66	,0463
53	,95234	—	154,80	248,47	6,33	40,24	,3999	3	,99404	—	2735,73	2834,34	4,39	3,53	,0351
52	,95301	—	157,80	251,42	6,38	39,77	,3952	2	,99557	—	4103,59	4199,35	4,24	2,38	,0237
51	,95368	—	160,90	254,50	6,40	39,29	,3904	1	,99716	—	8207,17	8303,07	4,10	1,21	,0120

TABLE I. HEAT 72°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,81927	100	—	100,00	—	100,00	,9930	100 + 50	,89159	100	41,01	137,83	3,18	72,55	,7205
1	,82157	—	0,82	100,72	0,10	99,29	,9860	51	,89250	—	41,84	138,61	3,23	72,15	,7165
2	,82383	—	1,64	101,44	0,20	98,58	,9790	52	,89341	—	42,66	139,39	3,27	71,74	,7125
3	,82603	—	2,46	102,16	0,30	97,89	,9721	53	,89430	—	43,48	140,16	3,32	71,34	,7085
4	,82817	—	3,28	102,88	0,40	97,20	,9653	54	,89517	—	44,29	140,94	3,35	70,95	,7046
100 + 5	,83026	—	4,10	103,61	0,49	96,52	,9585	100 + 55	,89602	—	45,11	141,72	3,39	70,56	,7007
6	,83229	—	4,92	104,34	0,58	95,84	,9518	56	,89687	—	45,93	142,50	3,43	70,17	,6969
7	,83428	—	5,74	105,08	0,66	95,17	,9452	57	,89770	—	46,75	143,28	3,47	69,79	,6931
8	,83623	—	6,56	105,81	0,75	94,51	,9386	58	,89852	—	47,57	144,06	3,51	69,41	,6893
9	,83812	—	7,39	106,55	0,84	93,85	,9321	59	,89933	—	48,39	144,84	3,55	69,04	,6855
100 + 10	,83995	—	8,20	107,29	0,91	93,20	,9256	100 + 60	,90011	—	49,22	145,62	3,60	68,67	,6819
11	,84175	—	9,02	108,04	0,98	92,56	,9192	61	,90090	—	50,04	146,41	3,63	68,30	,6782
12	,84350	—	9,84	108,78	1,06	91,93	,9129	62	,90166	—	50,86	147,19	3,67	67,93	,6746
13	,84522	—	10,66	109,53	1,13	91,30	,9067	63	,90242	—	51,68	147,97	3,71	67,57	,6710
14	,84690	—	11,48	110,28	1,20	90,68	,9005	64	,90317	—	52,50	148,76	3,74	67,22	,6675
100 + 15	,84854	—	12,31	111,03	1,28	90,06	,8944	100 + 65	,90391	—	53,32	149,54	3,78	66,87	,6640
16	,85018	—	13,13	111,78	1,35	89,46	,8885	66	,90466	—	54,14	150,32	3,82	66,52	,6606
17	,85177	—	13,95	112,53	1,42	88,86	,8825	67	,90540	—	54,96	151,11	3,85	66,17	,6572
18	,85334	—	14,76	113,29	1,47	88,27	,8766	68	,90613	—	55,78	151,89	3,89	65,83	,6538
19	,85489	—	15,58	114,04	1,54	87,68	,8708	69	,90685	—	56,60	152,67	3,93	65,50	,6504
100 + 20	,85640	—	16,40	114,80	1,60	87,11	,8650	100 + 70	,90755	—	57,42	153,46	3,96	65,16	,6471
21	,85788	—	17,22	115,55	1,67	86,54	,8594	71	,90824	—	58,24	154,25	3,99	64,83	,6438
22	,85933	—	18,04	116,30	1,74	85,98	,8537	72	,90892	—	59,06	155,03	4,03	64,50	,6405
23	,86077	—	18,86	117,06	1,80	85,42	,8483	73	,90959	—	59,88	155,82	4,06	64,17	,6373
24	,86217	—	19,69	117,82	1,87	84,87	,8429	74	,91025	—	60,70	156,61	4,09	63,85	,6341
100 + 25	,86356	—	20,51	118,59	1,92	84,33	,8374	100 + 75	,91090	—	61,52	157,39	4,13	63,53	,6309
26	,86491	—	21,33	119,35	1,98	83,79	,8321	76	,91155	—	62,34	158,18	4,16	63,22	,6278
27	,86624	—	22,15	120,11	2,04	83,26	,8268	77	,91218	—	63,16	158,96	4,20	62,90	,6247
28	,86754	—	22,97	120,88	2,09	82,73	,8216	78	,91280	—	63,98	159,76	4,22	62,59	,6216
29	,86883	—	23,79	121,64	2,15	82,21	,8164	79	,91343	—	64,80	160,55	4,25	62,29	,6185
100 + 30	,87008	—	24,61	122,40	2,21	81,70	,8113	100 + 80	,91405	—	65,62	161,34	4,28	61,98	,6155
31	,87133	—	25,43	123,17	2,26	81,19	,8062	81	,91466	—	66,44	162,13	4,31	61,68	,6125
32	,87255	—	26,25	123,94	2,31	80,69	,8013	82	,91527	—	67,26	162,91	4,35	61,38	,6095
33	,87375	—	27,07	124,71	2,36	80,19	,7963	83	,91587	—	68,08	163,69	4,39	61,09	,6067
34	,87494	—	27,89	125,48	2,41	79,70	,7914	84	,91646	—	68,90	164,49	4,41	60,79	,6038
100 + 35	,87610	—	28,71	126,24	2,47	79,21	,7866	100 + 85	,91704	—	69,72	165,28	4,44	60,50	,6009
36	,87724	—	29,53	127,01	2,52	78,73	,7819	86	,91761	—	70,54	166,07	4,47	60,22	,5980
37	,87835	—	30,35	127,78	2,57	78,26	,7772	87	,91818	—	71,36	166,86	4,50	59,93	,5952
38	,87944	—	31,17	128,55	2,62	77,79	,7715	88	,91873	—	72,19	167,65	4,54	59,65	,5924
39	,88053	—	31,99	129,33	2,66	77,33	,7679	89	,91927	—	73,01	168,44	4,57	59,37	,5896
100 + 40	,88159	—	32,81	130,10	2,71	76,87	,7633	100 + 90	,91981	—	73,83	169,23	4,60	59,09	,5868
41	,88267	—	33,63	130,87	2,76	76,41	,7588	91	,92035	—	74,65	170,02	4,63	58,82	,5841
42	,88372	—	34,46	131,64	2,82	75,96	,7543	92	,92088	—	75,47	170,81	4,66	58,54	,5814
43	,88476	—	35,27	132,41	2,86	75,52	,7499	93	,92141	—	76,29	171,61	4,68	58,27	,5787
44	,88578	—	36,09	133,18	2,91	75,08	,7456	94	,92193	—	77,11	172,40	4,71	58,01	,5760
100 + 45	,88679	—	36,91	133,95	2,96	74,65	,7413	100 + 95	,92244	—	77,93	173,19	4,74	57,74	,5734
46	,88778	—	37,73	134,73	3,00	74,22	,7371	96	,92295	—	78,73	173,97	4,76	57,48	,5709
47	,88875	—	38,55	135,50	3,05	73,80	,7329	97	,92345	—	79,55	174,76	4,79	57,22	,5683
48	,88971	—	39,37	136,28	3,09	73,38	,7287	98	,92395	—	80,37	175,55	4,82	56,96	,5657
49	,89066	—	40,19	137,05	3,14	72,96	,7246	99	,92445	—	81,20	176,35	4,85	56,71	,5631

TABLE II. HEAT 72°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92493	100	82,03	177,15	4,88	56,45	,5605
99	,92543	—	82,86	177,95	4,91	56,19	,5580
98	,92593	—	83,71	178,77	4,94	55,93	,5555
97	,92643	—	84,58	179,60	4,98	55,67	,5529
96	,92693	—	85,46	180,45	5,01	55,41	,5503
100 + 95	,92742	—	86,35	181,32	5,03	55,15	,5476
94	,92792	—	87,26	182,20	5,06	54,88	,5450
93	,92841	—	88,20	183,13	5,07	54,61	,5423
92	,92891	—	89,16	184,06	5,10	54,33	,5395
91	,92941	—	90,14	185,01	5,13	54,05	,5367
100 + 90	,92991	—	91,14	185,99	5,15	53,77	,5339
89	,93043	—	92,16	186,98	5,18	53,48	,5311
88	,93096	—	93,21	188,01	5,20	53,19	,5282
87	,93148	—	94,28	189,05	5,23	52,90	,5253
86	,93201	—	95,38	190,11	5,27	52,60	,5224
100 + 85	,93255	—	96,51	191,20	5,31	52,30	,5194
84	,93311	—	97,66	192,32	5,34	52,00	,5164
83	,93366	—	98,83	193,47	5,36	51,69	,5133
82	,93422	—	100,04	194,64	5,40	51,37	,5102
81	,93478	—	101,28	195,84	5,44	51,06	,5071
100 + 80	,93536	—	102,54	197,07	5,47	50,74	,5039
79	,93591	—	103,84	198,33	5,51	50,41	,5007
78	,93647	—	105,17	199,64	5,53	50,08	,4974
77	,93703	—	106,54	200,98	5,56	49,75	,4941
76	,93760	—	107,94	202,35	5,59	49,42	,4908
100 + 75	,93816	—	109,38	203,76	5,62	49,08	,4874
74	,93875	—	110,85	205,21	5,64	48,73	,4840
73	,93934	—	112,36	206,69	5,67	48,38	,4805
72	,93993	—	113,92	208,22	5,70	48,02	,4770
71	,94052	—	115,53	209,79	5,74	47,67	,4734
100 + 70	,94112	—	117,19	211,41	5,78	47,30	,4697
69	,94173	—	118,87	213,07	5,80	46,93	,4660
68	,94234	—	120,62	214,79	5,83	46,55	,4623
67	,94295	—	122,43	216,56	5,87	46,18	,4586
66	,94358	—	124,28	218,38	5,90	45,79	,4548
100 + 65	,94421	—	126,20	220,25	5,95	45,40	,4509
64	,94483	—	128,17	222,19	5,98	45,00	,4470
63	,94546	—	130,20	224,19	6,01	44,60	,4430
62	,94610	—	132,30	226,26	6,04	44,20	,4389
61	,94674	—	134,47	228,39	6,08	43,79	,4348
100 + 60	,94737	—	136,71	230,60	6,11	43,37	,4306
59	,94802	—	139,03	232,88	6,15	42,94	,4264
58	,94868	—	141,42	235,25	6,17	42,50	,4221
57	,94934	—	143,91	237,70	6,21	42,07	,4178
56	,95000	—	146,49	240,24	6,25	41,62	,4134
100 + 55	,95065	—	149,14	242,86	6,28	41,17	,4089
54	,95132	—	151,88	245,58	6,30	40,71	,4043
53	,95198	—	154,73	248,42	6,31	40,25	,3997
52	,95265	—	157,72	251,37	6,35	39,78	,3950
51	,95332	—	160,83	254,45	6,38	39,30	,3902

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95397	100	164,05	257,64	6,41	38,81	,3854
49	,95466	—	167,41	260,95	6,46	38,32	,3805
48	,95533	—	170,90	264,41	6,49	37,81	,3755
47	,95601	—	174,53	268,03	6,50	37,30	,3705
46	,95669	—	178,32	271,79	6,53	36,79	,3654
100 + 45	,95737	—	182,29	275,74	6,55	36,26	,3601
44	,95805	—	186,44	279,86	6,58	35,73	,3549
43	,95874	—	190,77	284,18	6,59	35,18	,3495
42	,95943	—	195,32	288,71	6,61	34,63	,3440
41	,96011	—	200,08	293,46	6,62	34,07	,3384
100 + 40	,96080	—	205,07	298,44	6,63	33,50	,3327
39	,96150	—	210,34	303,69	6,65	32,93	,3270
38	,96219	—	215,87	309,22	6,65	32,34	,3212
37	,96288	—	221,71	315,05	6,66	31,74	,3152
36	,96358	—	227,86	321,20	6,66	31,13	,3092
100 + 35	,96428	—	234,38	327,70	6,68	30,51	,3030
34	,96498	—	241,27	334,59	6,68	29,88	,2968
33	,96569	—	248,58	341,93	6,65	29,24	,2904
32	,96641	—	256,35	349,72	6,63	28,59	,2839
31	,96713	—	264,62	357,99	6,63	27,93	,2774
100 + 30	,96786	—	273,44	366,80	6,64	27,26	,2707
29	,96858	—	282,87	376,25	6,62	26,58	,2639
28	,96931	—	292,97	386,40	6,57	25,88	,2570
27	,97006	—	303,82	397,29	6,53	25,17	,2500
26	,97081	—	315,51	409,00	6,51	24,45	,2428
100 + 25	,97157	—	328,13	421,62	6,51	23,72	,2355
24	,97234	—	341,80	435,32	6,48	22,97	,2281
23	,97312	—	356,66	450,22	6,44	22,21	,2206
22	,97392	—	372,87	466,47	6,40	21,44	,2129
21	,97474	—	390,63	484,27	6,36	20,65	,2050
100 + 20	,97555	—	410,17	503,86	6,31	19,85	,1971
19	,97639	—	431,75	525,51	6,24	19,03	,1890
18	,97725	—	455,74	549,57	6,17	18,20	,1807
17	,97813	—	482,54	576,44	6,10	17,35	,1723
16	,97902	—	512,71	606,68	6,03	16,48	,1637
100 + 15	,97994	—	546,88	640,95	5,93	15,60	,1549
14	,98088	—	585,95	680,12	5,83	14,70	,1460
13	,98187	—	631,02	725,28	5,74	13,79	,1369
12	,98286	—	683,61	777,97	5,64	12,85	,1276
11	,98390	—	745,76	840,23	5,53	11,90	,1182
100 + 10	,98499	—	820,33	914,90	5,43	10,93	,1085
9	,98610	—	911,47	1006,20	5,27	9,94	,0987
8	,98726	—	1025,41	1120,26	5,15	8,93	,0887
7	,98848	—	1172,92	1266,88	5,04	7,89	,0784
6	,99075	—	1367,22	1462,34	4,88	6,84	,0679
100 + 5	,99108	—	1640,67	1735,93	4,74	5,76	,0572
4	,99245	—	2050,83	2146,27	4,56	4,66	,0463
3	,99391	—	2734,46	2830,04	4,42	3,53	,0351
2	,99544	—	4101,68	4197,41	4,27	2,38	,0237
1	,99704	—	8203,36	8299,21	4,15	1,21	,0120

TABLE I. HEAT 73°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,81878	100	—	100,00	—	100,00	,9924
1	,82108	—	0,82	100,72	0,10	99,29	,9854
2	,82334	—	1,64	101,44	0,20	98,58	,9784
3	,82553	—	2,46	102,16	0,30	97,89	,9715
4	,82768	—	3,28	102,88	0,40	97,20	,9647
100 + 5	,82977	—	4,10	103,61	0,49	96,52	,9579
6	,83180	—	4,92	104,34	0,58	95,84	,9512
7	,83379	—	5,74	105,08	0,66	95,17	,9446
8	,83574	—	6,56	105,81	0,75	94,51	,9380
9	,83764	—	7,38	106,55	0,83	93,85	,9315
100 + 10	,83947	—	8,20	107,29	0,91	93,21	,9250
11	,84127	—	9,02	108,03	0,99	92,57	,9186
12	,84302	—	9,84	108,78	1,06	91,93	,9123
13	,84474	—	10,66	109,53	1,13	91,30	,9061
14	,84642	—	11,48	110,28	1,20	90,68	,9000
100 + 15	,84806	—	12,30	111,02	1,28	90,07	,8939
16	,84970	—	13,12	111,78	1,34	89,46	,8879
17	,85129	—	13,94	112,53	1,41	88,87	,8820
18	,85286	—	14,76	113,28	1,48	88,27	,8761
19	,85440	—	15,58	114,04	1,54	87,69	,8703
100 + 20	,85592	—	16,39	114,80	1,59	87,11	,8646
21	,85740	—	17,21	115,55	1,66	86,54	,8589
22	,85885	—	18,04	116,30	1,74	85,98	,8533
23	,86029	—	18,86	117,06	1,80	85,42	,8478
24	,86169	—	19,68	117,82	1,86	84,87	,8423
100 + 25	,86308	—	20,50	118,58	1,92	84,33	,8369
26	,86443	—	21,32	119,34	1,98	83,79	,8316
27	,86576	—	22,14	120,11	2,03	83,20	,8263
28	,86706	—	22,96	120,87	2,09	82,73	,8211
29	,86835	—	23,78	121,63	2,15	82,21	,8159
100 + 30	,86960	—	24,60	122,40	2,20	81,70	,8108
31	,87085	—	25,41	123,17	2,24	81,19	,8058
32	,87207	—	26,23	123,93	2,30	80,69	,8009
33	,87327	—	27,06	124,70	2,36	80,19	,7959
34	,87446	—	27,88	125,47	2,41	79,70	,7910
100 + 35	,87562	—	28,70	126,23	2,47	79,21	,7862
36	,87676	—	29,52	127,00	2,52	78,73	,7815
37	,87788	—	30,34	127,78	2,56	78,26	,7768
38	,87897	—	31,16	128,55	2,61	77,79	,7711
39	,88006	—	31,98	129,32	2,66	77,33	,7675
100 + 40	,88112	—	32,80	130,09	2,71	76,87	,7629
41	,88220	—	33,61	130,86	2,75	76,41	,7584
42	,88325	—	34,44	131,63	2,81	75,97	,7539
43	,88429	—	35,26	132,41	2,85	75,53	,7495
44	,88531	—	36,08	133,17	2,91	75,09	,7452
100 + 45	,88632	—	36,90	133,94	2,96	74,66	,7409
46	,88731	—	37,71	134,72	2,99	74,23	,7367
47	,88828	—	38,53	135,49	3,04	73,80	,7325
48	,88924	—	39,35	136,27	3,08	73,38	,7283
49	,89019	—	40,17	137,04	3,13	72,97	,7242
100 + 50	,89112	100	40,99	137,82	3,17	72,56	,7201
51	,89204	—	41,82	138,60	3,22	72,15	,7161
52	,89294	—	42,64	139,38	3,26	71,75	,7121
53	,89383	—	43,46	140,15	3,31	71,35	,7082
54	,89471	—	44,27	140,93	3,34	70,96	,7042
100 + 55	,89556	—	45,09	141,71	3,38	70,57	,7003
56	,89641	—	45,91	142,49	3,42	70,18	,6965
57	,89724	—	46,73	143,27	3,46	69,80	,6927
58	,89806	—	47,55	144,05	3,50	69,42	,6889
59	,89887	—	48,37	144,83	3,54	69,04	,6852
100 + 60	,89964	—	49,19	145,61	3,58	68,67	,6815
61	,90043	—	50,01	146,40	3,61	68,31	,6779
62	,90120	—	50,83	147,18	3,65	67,94	,6743
63	,90196	—	51,65	147,96	3,69	67,58	,6707
64	,90271	—	52,47	148,75	3,72	67,23	,6672
100 + 65	,90345	—	53,29	149,53	3,76	66,88	,6637
66	,90420	—	54,11	150,31	3,80	66,53	,6602
67	,90494	—	54,93	151,09	3,84	66,18	,6568
68	,90567	—	55,75	151,87	3,88	65,84	,6534
69	,90639	—	56,57	152,65	3,92	65,51	,6501
100 + 70	,90709	—	57,39	153,44	3,95	65,17	,6468
71	,90778	—	58,22	154,23	3,99	64,84	,6435
72	,90846	—	59,03	155,01	4,02	64,51	,6402
73	,90913	—	59,85	155,80	4,05	64,18	,6370
74	,90979	—	60,67	156,59	4,08	63,86	,6338
100 + 75	,91044	—	61,49	157,38	4,11	63,54	,6306
76	,91109	—	62,31	158,16	4,15	63,23	,6275
77	,91173	—	63,13	158,95	4,18	62,91	,6244
78	,91235	—	63,95	159,74	4,21	62,60	,6213
79	,91298	—	64,77	160,53	4,24	62,29	,6182
100 + 80	,91360	—	65,59	161,32	4,27	61,99	,6152
81	,91421	—	66,41	162,11	4,30	61,69	,6122
82	,91482	—	67,23	162,89	4,34	61,39	,6092
83	,91542	—	68,05	163,68	4,37	61,10	,6064
84	,91601	—	68,87	164,47	4,40	60,80	,6035
100 + 85	,91659	—	69,69	165,26	4,43	60,51	,6006
86	,91716	—	70,51	166,05	4,46	60,22	,5977
87	,91773	—	71,33	166,84	4,49	59,94	,5949
88	,91829	—	72,15	167,63	4,52	59,66	,5921
89	,91883	—	72,97	168,42	4,55	59,38	,5893
100 + 90	,91937	—	73,79	169,21	4,58	59,10	,5865
91	,91991	—	74,61	170,00	4,61	58,82	,5838
92	,92044	—	75,43	170,79	4,64	58,55	,5811
93	,92097	—	76,25	171,59	4,66	58,28	,5784
94	,92149	—	77,07	172,38	4,69	58,01	,5758
100 + 95	,92199	—	77,89	173,17	4,72	57,75	,5731
96	,92251	—	78,70	173,95	4,75	57,49	,5706
97	,92301	—	79,52	174,74	4,78	57,23	,5680
98	,92351	—	80,33	175,53	4,80	56,97	,5654
99	,92402	—	81,16	176,33	4,83	56,71	,5629

TABLE II. HEAT 73°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92450	100	81,99	177,13	4,86	56,45	,5603	100 + 50	,95362	100	163,98	257,58	6,40	38,82	,3853
99	,92500	—	82,82	177,93	4,89	56,20	,5578	49	,95431	—	167,33	260,89	6,44	38,33	,3803
98	,92550	—	83,67	178,75	4,92	55,94	,5552	48	,95499	—	170,82	264,35	6,47	37,82	,3753
97	,92600	—	84,54	179,58	4,96	55,68	,5526	47	,95567	—	174,45	267,97	6,48	37,31	,3703
96	,92650	—	85,42	180,43	4,99	55,41	,5500	46	,95636	—	178,24	271,73	6,51	36,80	,3652
100 + 95	,92699	—	86,31	181,29	5,02	55,15	,5474	100 + 45	,95704	—	182,21	275,67	6,54	36,27	,3600
94	,92749	—	87,22	182,18	5,04	54,88	,5447	44	,95772	—	186,35	279,79	6,56	35,74	,3548
93	,92798	—	88,16	183,10	5,06	54,61	,5420	43	,95842	—	190,68	284,11	6,57	35,19	,3494
92	,92848	—	89,12	184,03	5,09	54,33	,5393	42	,95911	—	195,23	288,64	6,59	34,64	,3439
91	,92899	—	90,10	184,98	5,12	54,05	,5365	41	,95980	—	199,99	293,38	6,61	34,08	,3383
100 + 90	,92949	—	91,10	185,96	5,14	53,77	,5337	100 + 40	,96049	—	204,98	298,36	6,62	33,51	,3326
89	,93001	—	92,12	186,95	5,17	53,48	,5309	39	,96119	—	210,24	303,60	6,64	32,94	,3269
88	,93054	—	93,17	187,98	5,19	53,19	,5280	38	,96189	—	215,77	309,13	6,64	32,35	,3211
87	,93106	—	94,24	189,02	5,22	52,90	,5251	37	,96259	—	221,60	314,96	6,64	31,75	,3151
86	,93160	—	95,33	190,08	5,25	52,61	,5222	36	,96329	—	227,75	321,10	6,65	31,14	,3091
100 + 85	,93214	—	96,46	191,17	5,29	52,31	,5191	100 + 35	,96400	—	234,27	327,60	6,67	30,52	,3029
84	,93270	—	97,61	192,29	5,32	52,01	,5161	34	,96471	—	241,16	334,49	6,67	29,89	,2967
83	,93325	—	98,78	193,44	5,34	51,70	,5131	33	,96542	—	248,46	341,82	6,64	29,25	,2904
82	,93381	—	99,99	194,61	5,38	51,38	,5100	32	,96614	—	256,23	349,60	6,63	28,60	,2839
81	,93437	—	101,23	195,81	5,42	51,07	,5069	31	,96687	—	264,50	357,87	6,63	27,94	,2773
100 + 80	,93495	—	102,49	197,04	5,45	50,75	,5037	100 + 30	,96760	—	273,31	366,68	6,63	27,27	,2706
79	,93550	—	103,79	198,30	5,49	50,42	,5005	29	,96833	—	282,74	376,13	6,61	26,59	,2639
78	,93606	—	105,12	199,61	5,51	50,09	,4972	28	,96907	—	292,83	386,26	6,57	25,89	,2569
77	,93662	—	106,49	200,94	5,55	49,76	,4939	27	,96982	—	303,68	397,14	6,54	25,18	,2499
76	,93719	—	107,89	202,32	5,57	49,43	,4906	26	,97057	—	315,36	408,85	6,51	24,46	,2428
100 + 75	,93775	—	109,33	203,73	5,60	49,09	,4872	100 + 25	,97134	—	327,98	421,47	6,51	23,73	,2355
74	,93834	—	110,80	205,18	5,62	48,74	,4838	24	,97211	—	341,64	435,16	6,48	22,98	,2281
73	,93893	—	112,31	206,65	5,66	48,39	,4803	23	,97290	—	356,49	450,05	6,44	22,22	,2205
72	,93952	—	113,87	208,18	5,69	48,03	,4768	22	,97371	—	372,70	466,30	6,40	21,44	,2128
71	,94011	—	115,48	209,76	5,72	47,67	,4732	21	,97453	—	390,45	484,09	6,36	20,65	,2050
100 + 70	,94071	—	117,13	211,37	5,76	47,31	,4695	100 + 20	,97535	—	409,98	503,67	6,31	19,85	,1970
69	,94132	—	118,82	213,03	5,79	46,94	,4658	19	,97620	—	431,55	525,30	6,25	19,04	,1889
68	,94193	—	120,57	214,76	5,81	46,56	,4621	18	,97706	—	455,53	549,35	6,18	18,20	,1806
67	,94255	—	122,37	216,52	5,85	46,18	,4584	17	,97795	—	482,32	576,20	6,12	17,35	,1722
66	,94318	—	124,22	218,34	5,88	45,80	,4546	16	,97885	—	512,47	606,43	6,04	16,49	,1636
100 + 65	,94381	—	126,14	220,21	5,93	45,41	,4507	100 + 15	,97977	—	546,63	640,68	5,95	15,61	,1549
64	,94443	—	128,11	222,15	5,96	45,01	,4468	14	,98072	—	585,68	679,83	5,85	14,71	,1460
63	,94507	—	130,14	224,15	5,99	44,61	,4428	13	,98172	—	630,73	724,97	5,76	13,79	,1369
62	,94571	—	132,24	226,22	6,02	44,20	,4387	12	,98271	—	683,29	777,63	5,66	12,86	,1276
61	,94635	—	134,41	228,35	6,06	43,79	,4346	11	,98375	—	745,41	839,86	5,55	11,90	,1182
100 + 60	,94699	—	136,65	230,55	6,10	43,37	,4304	100 + 10	,98484	—	819,95	914,49	5,46	10,93	,1085
59	,94764	—	138,97	232,84	6,13	42,94	,4262	9	,98596	—	911,05	1005,75	5,30	9,94	,0987
58	,94831	—	141,36	235,20	6,16	42,51	,4220	8	,98712	—	1024,93	1119,76	5,17	8,93	,0886
57	,94897	—	143,84	237,65	6,19	42,07	,4176	7	,98834	—	1172,39	1266,31	5,08	7,90	,0784
56	,94963	—	146,42	240,19	6,23	41,63	,4132	6	,99061	—	1366,58	1461,68	4,90	6,84	,0679
100 + 55	,95029	—	149,07	242,81	6,26	41,18	,4087	100 + 5	,99094	—	1639,91	1735,13	4,78	5,76	,0572
54	,95096	—	151,81	245,53	6,28	40,72	,4042	4	,99231	—	2049,88	2145,29	4,59	4,66	,0463
53	,95162	—	154,66	248,37	6,29	40,26	,3996	3	,99378	—	2733,18	2828,73	4,45	3,53	,0351
52	,95229	—	157,64	251,31	6,34	39,79	,3949	2	,99531	—	4099,78	4195,47	4,31	2,38	,0237
51	,95296	—	160,76	254,40	6,36	39,31	,3901	1	,99691	—	8199,55	8295,35	4,20	1,21	,0120

TABLE I. HEAT 74°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,81829	100	—	100,00	—	100,00	,9919
1	,82059	—	0,82	100,72	0,10	99,29	,9848
2	,82284	—	1,64	101,44	0,20	98,58	,9778
3	,82504	—	2,46	102,16	0,30	97,89	,9709
4	,82719	—	3,28	102,88	0,40	97,20	,9641
100 + 5	,82927	—	4,10	103,61	0,49	96,52	,9573
6	,83131	—	4,92	104,34	0,58	95,84	,9506
7	,83330	—	5,74	105,07	0,66	95,17	,9440
8	,83525	—	6,56	105,81	0,75	94,51	,9374
9	,83715	—	7,38	106,54	0,84	93,86	,9309
100 + 10	,83899	—	8,20	107,28	0, 2	93,21	,9245
11	,84079	—	9,01	108,03	0,98	92,57	,9181
12	,84254	—	9,83	108,78	1,05	91,93	,9118
13	,84426	—	10,65	109,52	1,13	91,30	,9056
14	,84594	—	11,47	110,27	1,20	90,68	,8995
100 + 15	,84758	—	12,30	111,02	1,28	90,07	,8934
16	,84921	—	13,12	111,77	1,35	89,47	,8874
17	,85080	—	13,93	112,52	1,41	88,87	,8815
18	,85237	—	14,75	113,28	1,47	88,28	,8756
19	,85391	—	15,57	114,03	1,54	87,69	,8698
100 + 20	,85544	—	16,39	114,79	1,60	87,11	,8641
21	,85691	—	17,20	115,54	1,66	86,54	,8584
22	,85837	—	18,03	116,30	1,73	85,98	,8528
23	,85981	—	18,85	117,05	1,80	85,43	,8473
24	,86121	—	19,67	117,81	1,86	84,88	,8419
100 + 25	,86260	—	20,49	118,58	1,91	84,33	,8365
26	,86395	—	21,31	119,34	1,97	83,79	,8311
27	,86528	—	22,13	120,10	2,03	83,26	,8258
28	,86658	—	22,95	120,87	2,08	82,74	,8206
29	,86787	—	23,77	121,63	2,14	82,22	,8155
100 + 30	,86912	—	24,59	122,39	2,20	81,70	,8104
31	,87037	—	25,40	123,16	2,24	81,19	,8053
32	,87159	—	26,22	123,93	2,29	80,69	,8004
33	,87279	—	27,04	124,70	2,34	80,20	,7954
34	,87398	—	27,86	125,47	2,39	79,71	,7906
100 + 35	,87514	—	28,68	126,23	2,45	79,22	,7858
36	,87628	—	29,50	127,00	2,50	78,74	,7811
37	,87740	—	30,32	127,77	2,55	78,27	,7764
38	,87850	—	31,15	128,54	2,61	77,80	,7707
39	,87959	—	31,96	129,31	2.65	77,33	,7671
100 + 40	,88065	—	32,78	130,09	2,69	76,87	,7625
41	,88173	—	33,60	130,86	2,74	76,42	,7580
42	,88278	—	34,43	131,63	2,80	75,97	,7535
43	,88382	—	35,24	132,40	2,84	75,53	,7491
44	,88484	—	36,06	133,17	2,89	75,09	,7448
100 + 45	,88585	—	36,88	133,94	2,94	74,66	,7405
46	,88684	—	37,69	134,71	2,98	74,23	,7363
47	,88781	—	38,51	135,49	3,02	73,81	,7321
48	,88877	—	39,33	136,26	3,07*	73,39	,7279
49	,88972	—	40,15	137,03	3,12	72,97	,7238

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,89065	100	40,97	137,81	3,16	72,56	,7197
51	,89157	—	41,80	138,59	3,21	72,16	,7157
52	,89248	—	42,62	139,37	3,25	71,75	,7117
53	,89337	—	43,44	140,14	3,30	71,35	,7078
54	,89425	—	44,25	140,92	3,33	70,96	,7039
100 + 55	,89510	—	45,07	141,70	3,37	70,57	,7000
56	,89595	—	45,89	142,48	3,41	70,18	,6962
57	,89678	—	46,71	143,26	3,45	69,80	,6924
58	,89760	—	47,53	144,04	3,49	69,42	,6886
59	,89840	—	48,35	144,82	3,53	69,05	,6849
100 + 60	,89918	—	49,17	145,60	3,57	68,68	,6812
61	,89997	—	49,99	146,39	3,60	68,31	,6776
62	,90073	—	50,81	147,17	3,64	67,94	,6739
63	,90149	—	51,63	147,95	3,68	67,58	,6703
64	,90224	—	52,45	148,74	3,71	67,23	,6668
100 + 65	,90299	—	53,27	149,52	3,75	66,88	,6633
66	,90374	—	54,09	150,30	3,79	66,53	,6599
67	,90448	—	54,91	151,08	3,83	66,18	,6565
68	,90521	—	55,72	151,86	3,86	65,84	,6531
69	,90593	—	56,54	152,64	3,90	65,51	,6498
100 + 70	,90663	—	57,36	153,42	3,94	65,17	,6464
71	,90732	—	58,19	154,22	3,97	64,84	,6431
72	,90800	—	59,00	155,00	4,00	64,51	,6399
73	,90867	—	59,82	155,79	4,03	64,19	,6367
74	,90933	—	60,64	156,58	4,06	63,86	,6335
100 + 75	,90999	—	61,46	157,36	4,10	63,54	,6303
76	,91063	—	62,28	158,15	4,13	63,23	,6272
77	,91127	—	63,10	158,93	4,17	62,91	,6241
78	,91190	—	63,92	159,72	4,20	62,60	,6210
79	,91253	—	64,74	160,51	4,23	62,30	,6179
100 + 80	,91316	—	65,56	161,30	4,26	61,99	,6149
81	,91376	—	66,38	162,09	4,29	61,69	,6119
82	,91437	—	67,20	162,87	4,33	61,40	,6089
83	,91497	—	68,02	163,66	4,36	61,10	,6061
84	,91556	—	68,84	164,46	4,38	60,81	,6032
100 + 85	,91614	—	69,66	165,24	4,42	60,52	,6003
86	,91671	—	70,48	166,03	4,45	60,23	,5974
87	,91728	—	71,30	166,82	4,48	59,94	,5946
88	,91784	—	72,12	167,61	4,51	59,66	,5918
89	,91839	—	72,94	168,40	4,54	59,38	,5890
100 + 90	,91893	—	73,76	169,19	4,57	59,10	,5862
91	,91947	—	74,58	169,98	4,60	58,83	,5835
92	,92000	—	75,39	170,77	4,62	58,56	,5808
93	,92053	—	76,21	171,57	4,64	58,29	,5781
94	,92105	—	77,03	172,36	4,67	58,02	,5755
100 + 95	,92155	—	77,85	173,15	4,70	57,75	,5728
96	,92207	—	78,66	173,93	4,73	57,49	,5703
97	,92257	—	79,48	174,72	4,76	57,23	,5677
98	,92307	—	80,30	175,51	4,79	56,97	,5651
99	,92358	—	81,12	176,31	4,81	56,72	,5626

TABLE II.

HEAT 74°.

I. Water and Spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92407	100	81,95	177,11	4,84	56,46	,5600
99	,92457	—	82,78	177,91	4,87	56,20	,5575
98	,92507	—	83,63	178,73	4,90	55,94	,5549
97	,92557	—	84,50	179,56	4,94	55,68	,5524
96	,92607	—	85,38	180,41	4,97	55,42	,5598
100 + 95	,92656	—	86,27	181,27	5,00	55,16	,5471
94	,92706	—	87,18	182,16	5,02	54,89	,5445
93	,92756	—	88,12	183,08	5,04	54,62	,5418
92	,92806	—	89,08	184,00	5,08	54,34	,5390
91	,92856	—	90,06	184,96	5,10	54,06	,5362
100 + 90	,92907	—	91,06	185,94	5,12	53,78	,5334
89	,92959	—	92,08	186,92	5,16	53,49	,5306
88	,93012	—	93,13	187,95	5,18	53,20	,5277
87	,93065	—	94,20	188,99	5,21	52,91	,5248
86	,93119	—	95,29	190,05	5,24	52,62	,5219
100 + 85	,93173	—	96,41	191,14	5,27	52,32	,5189
84	,93229	—	97,57	192,26	5,31	52,02	,5159
83	,93285	—	98,74	193,41	5,33	51,71	,5129
82	,93341	—	99,94	194,58	5,36	51,39	,5098
81	,93397	—	101,18	195,78	5,40	51,08	,5067
100 + 80	,93455	—	102,44	197,01	5,43	50,76	,5035
79	,93509	—	103,74	198,27	5,47	50,43	,5003
78	,93566	—	105,07	199,58	5,49	50,10	,4970
77	,93622	—	106,44	200,91	5,53	49,77	,4937
76	,93679	—	107,84	202,28	5,56	49,44	,4903
100 + 75	,93735	—	109,28	203,70	5,58	49,09	,4869
74	,93794	—	110,75	205,14	5,61	48,75	,4835
73	,93852	—	112,26	206,62	5,64	48,40	,4801
72	,93911	—	113,82	208,15	5,67	48,04	,4766
71	,93970	—	115,43	209,72	5,71	47,68	,4730
100 + 70	,94031	—	117,08	211,34	5,74	47,32	,4693
69	,94091	—	118,77	213,00	5,77	46,95	,4656
68	,94153	—	120,51	214,72	5,79	46,57	,4619
67	,94213	—	122,31	216,49	5,82	46,19	,4582
66	,94278	—	124,17	218,30	5,87	45,81	,4544
100 + 65	,94340	—	126,08	220,17	5,91	45,42	,4505
64	,94404	—	128,05	222,11	5,94	45,02	,4466
63	,94468	—	130,08	224,11	5,97	44,62	,4426
62	,94532	—	132,18	226,18	6,00	44,21	,4385
61	,94597	—	134,35	228,31	6,04	43,80	,4344
100 + 60	,94661	—	136,59	230,51	6,08	43,38	,4303
59	,94727	—	138,90	232,79	6,11	42,95	,4261
58	,94794	—	141,30	235,15	6,15	42,52	,4218
57	,94860	—	143,77	237,60	6,17	42,08	,4175
56	,94927	—	146,35	240,14	6,21	41,64	,4131
100 + 55	,94993	—	149,00	242,76	6,24	41,19	,4086
54	,95060	—	151,74	245,48	6,26	40,73	,4041
53	,95126	—	154,59	248,32	6,27	40,27	,3995
52	,95193	—	157,57	251,26	6,31	39,80	,3948
51	,95260	—	160,69	254,34	6,35	39,32	,3900

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95327	100	163,91	257,52	6,39	38,83	,3852
49	,95396	—	167,25	260,83	6,42	38,34	,3802
48	,95465	—	170,74	264,29	6,45	37,83	,3753
47	,95533	—	174,37	267,91	6,46	37,32	,3703
46	,95602	—	178,16	271,67	6,49	36,81	,3651
100 + 45	,95671	—	182,12	275,60	6,52	36,28	,3599
44	,95740	—	186,26	279,72	6,54	35,75	,3546
43	,95810	—	190,59	284,04	6,55	35,20	,3492
42	,95879	—	195,14	288,56	6,58	34,65	,3438
41	,95949	—	199,90	293,30	6,60	34,09	,3382
100 + 40	,96018	—	204,89	298,28	6,61	33,52	,3325
39	,96089	—	210,14	303,51	6,63	32,95	,3268
38	,96159	—	215,67	309,04	6,63	32,36	,3210
37	,96230	—	221,50	314,86	6,64	31,76	,3150
36	,96301	—	227,65	321,00	6,65	31,15	,3090
100 + 35	,96372	—	234,16	327,50	6,66	30,53	,3029
34	,96444	—	241,05	334,39	6,66	29,90	,2966
33	,96515	—	248,35	341,71	6,64	29,26	,2903
32	,96588	—	256,11	349,49	6,62	28,61	,2838
31	,96661	—	264,38	357,75	6,63	27,95	,2773
100 + 30	,96734	—	273,18	366,56	6,82	27,28	,2706
29	,96808	—	282,61	376,00	6,61	26,60	,2638
28	,96883	—	292,70	386,13	6,57	25,90	,2569
27	,96958	—	303,54	397,00	6,54	25,19	,2499
26	,97033	—	315,21	408,70	6,51	24,47	,2427
100 + 25	,97110	—	327,83	421,32	6,51	23,74	,2354
24	,97188	—	341,48	435,01	6,47	22,99	,2280
23	,97268	—	356,33	449,89	6,44	22,23	,2205
22	,97350	—	372,53	466,13	6,40	21,45	,2128
21	,97432	—	390,27	483,91	6,36	20,66	,2049
100 + 20	,97515	—	409,79	503,48	6,31	19,86	,1970
19	,97601	—	431,35	525,10	6,25	19,04	,1889
18	,97688	—	455,32	549,13	6,19	18,21	,1806
17	,97777	—	482,10	575,97	6,13	17,36	,1722
16	,97868	—	512,23	606,18	6,05	16,50	,1636
100 + 15	,97960	—	546,38	640,41	5,97	15,62	,1549
14	,98056	—	585,41	679,54	5,87	14,72	,1460
13	,98157	—	630,44	724,66	5,78	13,80	,1369
12	,98256	—	682,97	777,29	5,68	12,86	,1276
11	,98360	—	745,07	839,49	5,58	11,91	,1181
100 + 10	,98469	—	819,57	914,08	5,49	10,94	,1085
9	,98582	—	910,63	1005,30	5,33	9,95	,0987
8	,98698	—	1024,46	1119,26	5,20	8,93	,0886
7	,98820	—	1171,86	1265,74	5,12	7,90	,0784
6	,99047	—	1365,95	1461,02	4,93	6,85	,0679
100 + 5	,99080	—	1639,15	1734,34	4,81	5,77	,0572
4	,99218	—	2048,93	2144,30	4,63	4,66	,0463
3	,99365	—	2731,91	2827,43	4,48	3,53	,0351
2	,99518	—	4097,87	4193,52	4,35	2,38	,0237
1	,99678	—	8195,74	8291,50	4,24	1,21	,0120

TABLE I. HEAT 75°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,81780	100	—	100,00	—	100,00	,9913	100 + 50	,89018	100	40,96	137,80	3,16	72,57	,7193
1	,82010	—	0,82	100,72	0,10	99,29	,9842	51	,89110	—	41,78	138,58	3,20	72,16	,7153
2	,82235	—	1,64	101,44	0,20	98,58	,9772	52	,89201	—	42,60	139,36	3,24	71,76	,7113
3	,82455	—	2,46	102,16	0,30	97,89	,9703	53	,89290	—	43,42	140,13	3,29	71,36	,7074
4	,82669	—	3,28	102,88	0,40	97,21	,9635	54	,89378	—	44,23	140,91	3,32	70,97	,7035
100 + 5	,82878	—	4,10	103,61	0,49	96,52	,9567	100 + 55	,89464	—	45,05	141,69	3,36	70,58	,6996
6	,83082	—	4,91	104,34	0,57	95,84	,9500	56	,89548	—	45,87	142,47	3,40	70,19	,6958
7	,83281	—	5,73	105,07	0,66	95,17	,9434	57	,89631	—	46,69	143,25	3,44	69,81	,6920
8	,83476	—	6,55	105,81	0,74	94,51	,9368	58	,89713	—	47,51	144,03	3,48	69,43	,6882
9	,83666	—	7,37	106,54	0,83	93,86	,9303	59	,89793	—	48,33	144,81	3,52	69,05	,6845
100 + 10	,83851	—	8,19	107,28	0,91	93,21	,9239	100 + 60	,89872	—	49,15	145,59	3,56	68,68	,6808
11	,84031	—	9,01	108,03	0,98	92,57	,9176	61	,89950	—	49,97	146,38	3,59	68,32	,6772
12	,84206	—	9,83	108,77	1,06	91,94	,9113	62	,90026	—	50,79	147,16	3,63	67,95	,6736
13	,84378	—	10,65	109,52	1,13	91,31	,9051	63	,90102	—	51,61	147,94	3,67	67,59	,6700
14	,84546	—	11,47	110,27	1,20	90,69	,8990	64	,90177	—	52,43	148,73	3,70	67,24	,6665
100 + 15	,84710	—	12,29	111,02	1,27	90,07	,8930	100 + 65	,90252	—	53,25	149,51	3,74	66,89	,6630
16	,84872	—	13,11	111,77	1,34	89,47	,8870	66	,90327	—	54,07	150,29	3,78	66,54	,6595
17	,85031	—	13,93	112,52	1,41	88,87	,8810	67	,90401	—	54,89	151,07	3,82	66,19	,6561
18	,85188	—	14,75	113,28	1,47	88,28	,8751	68	,90474	—	55,70	151,85	3,85	65,85	,6527
19	,85342	—	15,56	114,03	1,53	87,69	,8693	69	,90546	—	56,52	152,63	3,89	65,52	,6494
100 + 20	,85496	—	16,38	114,79	1,59	87,12	,8636	100 + 70	,90617	—	57,34	153,41	3,93	65,18	,6461
21	,85643	—	17,20	115,54	1,66	86,55	,8579	71	,90686	—	58,16	154,20	3,96	64,85	,6428
22	,85788	—	18,02	116,30	1,72	85,99	,8523	72	,90754	—	58,98	154,99	3,99	64,52	,6395
23	,85932	—	18,84	117,05	1,79	85,43	,8468	73	,90821	—	59,80	155,78	4,02	64,20	,6363
24	,86073	—	19,66	117,81	1,85	84,88	,8414	74	,90887	—	60,62	156,56	4,06	63,87	,6331
100 + 25	,86212	—	20,49	118,57	1,91	84,34	,8360	100 + 75	,90952	—	61,44	157,35	4,09	63,55	,6300
26	,86347	—	21,30	119,33	1,97	83,80	,8306	76	,91017	—	62,26	158,14	4,12	63,24	,6268
27	,86480	—	22,12	120,10	2,02	83,27	,8253	77	,91081	—	63,08	158,92	4,16	62,92	,6237
28	,86610	—	22,94	120,86	2,08	82,74	,8201	78	,91145	—	63,90	159,71	4,19	62,61	,6206
29	,86738	—	23,76	121,62	2,14	82,22	,8150	79	,91208	—	64,71	160,50	4,21	62,31	,6176
100 + 30	,86864	—	24,58	122,39	2,19	81,71	,8099	100 + 80	,91270	—	65,53	161,28	4,25	62,00	,6146
31	,86988	—	25,39	123,16	2,23	81,20	,8049	81	,91331	—	66,35	162,07	4,28	61,70	,6116
32	,87110	—	26,21	123,92	2,29	80,70	,7999	82	,91392	—	67,17	162,86	4,31	61,40	,6087
33	,87231	—	27,03	124,69	2,34	80,20	,7950	83	,91452	—	67,99	163,65	4,34	61,11	,6058
34	,87350	—	27,85	125,46	2,39	79,71	,7901	84	,91511	—	68,81	164,44	4,37	60,81	,6029
100 + 35	,87466	—	28,67	126,22	2,45	79,22	,7853	100 + 85	,91569	—	69,63	165,22	4,41	60,52	,6000
36	,87580	—	29,49	126,99	2,50	78,74	,7806	86	,91626	—	70,45	166,01	4,44	60,24	,5971
37	,87692	—	30,31	127,76	2,55	78,27	,7759	87	,91683	—	71,27	166,80	4,47	59,95	,5943
38	,87802	—	31,13	128,53	2,60	77,80	,7712	88	,91739	—	72,09	167,59	4,50	59,67	,5915
39	,87911	—	31,95	129,31	2,64	77,34	,7666	89	,91794	—	72,91	168,38	4,53	59,39	,5887
100 + 40	,88018	—	32,77	130,08	2,69	76,88	,7621	100 + 90	,91849	—	73,73	169,17	4,56	59,11	,5860
41	,88125	—	33,59	130,85	2,74	76,43	,7576	91	,91902	—	74,55	169,96	4,59	58,84	,5832
42	,88230	—	34,41	131,62	2,79	75,98	,7531	92	,91955	—	75,36	170,75	4,61	58,57	,5805
43	,88334	—	35,22	132,39	2,83	75,54	,7487	93	,92008	—	76,18	171,55	4,63	58,30	,5779
44	,88437	—	36,04	133,16	2,88	75,10	,7444	94	,92060	—	77,00	172,34	4,66	58,03	,5752
100 + 45	,88538	—	36,86	133,93	2,93	74,67	,7401	100 + 95	,92111	—	77,82	173,13	4,69	57,76	,5726
46	,88637	—	37,68	134,70	2,98	74,24	,7359	96	,92162	—	78,63	173,91	4,72	57,50	,5700
47	,88734	—	38,50	135,48	3,02	73,81	,7317	97	,92213	—	79,45	174,70	4,75	57,24	,5674
48	,88830	—	39,32	136,25	3,07	73,39	,7275	98	,92263	—	80,27	175,49	4,78	56,98	,5648
49	,88925	—	40,14	137,03	3,11	72,98	,7234	99	,92314	—	81,09	176,29	4,80	56,73	,5623

TABLE II. HEAT 75°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92364	100	81,92	177,09	4,83	56,47	,5598	100 + 50	,95292	100	163,84	257,46	6,38	38,84	,3850
99	,92414	—	82,75	177,89	4,86	56,21	,5572	49	,95361	—	167,18	260,78	6,40	38,35	,3801
98	,92464	—	83,60	178,71	4 89	55,95	,5547	48	,95430	—	170,56	264,24	6,42	37,84	,3751
97	,92513	—	84,46	179,54	4,92	55,69	,5521	47	,95499	—	174,29	267,85	6,44	37,33	,3701
96	,92563	—	85,34	180,39	4,95	55,43	,5495	46	,95568	—	178,08	271,61	6,47	36,82	,3650
100 + 95	,92613	—	86,23	181,25	4,98	55,17	,5469	100 + 45	,95638	—	182,04	275,53	6,51	36,29	,3598
94	,92663	—	87,14	182,14	5,00	54,90	,5442	44	,95707	—	186,18	279,65	6,53	35,76	,3545
93	,92713	—	88,08	183,05	5,03	54,63	,5415	43	,95777	—	190,51	283,97	6,54	35,21	,3491
92	,92763	—	89,04	183,98	5,06	54,35	,5388	42	,95847	—	195,05	288,49	6,56	34,66	,3436
91	,92814	—	90,02	184,94	5,08	54,07	,5360	41	,95917	—	199,81	293,23	6,58	34,10	,3380
100 + 90	,92865	—	91,02	185,91	5,11	53,79	,5332	100 + 40	,95987	—	204,80	298,20	6,60	33,53	,3324
89	,92917	—	92,04	186,90	5,14	53,50	,5304	39	,96058	—	210,05	303,43	6,62	32,96	,3267
88	,92970	—	93,09	187,92	5,17	53,21	,5275	38	,96129	—	215,57	308,95	6,62	32,37	,3209
87	,93023	—	94,16	188,96	5,20	52,92	,5246	37	,96200	—	221,40	314,76	6,64	31,77	,3149
86	,93077	—	95,25	190,02	5,23	52,62	,5217	36	,96272	—	227,55	320,90	6,65	31,16	,3089
100 + 85	,93132	—	96,37	191,11	5,26	52,32	,5187	100 + 35	,96344	—	234,05	327,41	6,64	30,54	,3028
84	,93188	—	97,52	192,23	5,29	52,02	,5157	34	,96416	—	240,94	334,29	6,65	29,91	,2965
83	,93244	—	98,69	193,38	5,31	51,71	,5126	33	,96488	—	248,24	341,61	6,63	29,27	,2902
82	,93300	—	99,90	194,55	5,35	51,40	,5095	32	,96561	—	256,00	349,38	6,62	28,62	,2837
81	,93356	—	101,14	195,75	5,39	51,08	,5064	31	,96634	—	264,26	357,64	6,62	27,96	,2772
100 + 80	,93413	—	102,40	196,98	5,42	50,77	,5032	100 + 30	,96708	—	273,06	366,44	6,62	27,29	,2705
79	,93469	—	103,69	198,24	5,45	50,44	,5000	29	,96783	—	282,48	375,88	6,60	26,60	,2637
78	,93525	—	105,02	199,54	5,48	50,11	,4967	28	,96858	—	292,57	386,00	6,57	25,91	,2568
77	,93581	—	106,39	200,88	5,51	49,78	,4934	27	,96933	—	303,40	396,86	6,54	25,20	,2498
76	,93638	—	107,79	202,25	5,54	49,44	,4901	26	,97009	—	315,07	408,55	6,52	24,48	,2426
100 + 75	,93695	—	109,23	203,66	5,57	49,10	,4867	100 + 25	,97086	—	327,68	421,17	6,51	23,74	,2354
74	,93753	—	110,70	205,10	5,60	48,75	,4833	24	,97165	—	341,33	434,86	6,47	22,99	,2280
73	,93811	—	112,21	206,59	5,62	48,40	,4798	23	,97246	—	356,17	449,73	6,44	22,23	,2204
72	,93870	—	113,77	208,12	5,65	48,05	,4763	22	,97328	—	372,36	466,96	6,40	21,46	,2127
71	,93929	—	115,38	209,69	5,69	47,69	,4727	21	,97411	—	389,09	483,73	6,36	20,67	,2049
100 + 70	,93989	—	117,03	211,31	5,72	47,32	,4691	100 + 20	,97495	—	409,60	503,29	6,31	19,87	,1970
69	,94050	—	118,72	212,97	5,75	46,95	,4654	19	,97581	—	431,15	524,90	6,25	19,05	,1889
68	,94112	—	120,46	214,68	5,78	46,58	,4617	18	,97669	—	455,11	548,91	6,20	18,21	,1806
67	,94174	—	122,26	216,45	5,81	46,20	,4580	17	,97759	—	481,88	575,74	6,14	17,36	,1722
66	,94237	—	124,12	218,27	5,85	45,82	,4542	16	,97850	—	511,99	605,93	6,06	16,50	,1636
100 + 65	,94301	—	126,03	220,14	5,89	45,43	,4503	100 + 15	,97943	—	546,13	640,15	5,98	15,62	,1549
64	,94364	—	127,99	222,07	5,92	45,03	,4464	14	,98039	—	585,14	679,25	5,89	14,72	,1460
63	,94428	—	130,02	224,07	5,95	44,63	,4424	13	,98138	—	630,15	724,35	5,80	13,80	,1369
62	,94493	—	132,12	226,14	5,98	44,22	,4383	12	,98240	—	682,66	776,96	5,70	12,87	,1276
61	,94558	—	134,29	228,27	6,02	43,81	,4342	11	,98345	—	744,72	839,12	5,60	11,92	,1181
100 + 60	,94623	—	136,53	230,47	6,06	43,39	,4301	100 + 10	,98454	—	819,19	913,68	5,51	10,94	,1085
59	,94689	—	138,84	232,74	6,10	42,96	,4259	9	,98567	—	910,21	1004,85	5,36	9,95	,0987
58	,94756	—	141,23	235,10	6,13	42,53	,4216	8	,98684	—	1023,99	1118,76	5,23	8,94	,0886
57	,94823	—	143,71	237,55	6,16	42,09	,4173	7	,98806	—	1170,33	1265,17	5,16	7,90	,0784
56	,94890	—	146,28	240,09	6,19	41,65	,4129	6	,98933	—	1365,32	1460,36	4,96	6,85	,0679
100 + 55	,94957	—	148,93	242,71	6,22	41,20	,4084	100 + 5	,99066	—	1638,39	1733,55	4,84	5,77	,0572
54	,95023	—	151,67	245,43	6,24	40,74	,4039	4	,99205	—	2047,98	2143,32	4,66	4,66	,0462
53	,95090	—	154,52	248,26	6,26	40,28	,3993	3	,99351	—	2730,64	2820,13	4,51	3,53	,0351
52	,95157	—	157,50	251,21	6,29	39,81	,3946	2	,99504	—	4095,96	4191,58	4,38	2,38	,0237
51	,95224	—	160,61	254,28	6,33	39,33	,3898	1	,99664	—	8191,92	8287,65	4,27	1,21	,0120

TABLE I. HEAT 76°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,81730	100	—	100,00	—	100,00	,9907	100 + 50	,88970	100	40,94	137,79	3,15	72,57	,7190
1	,81961	—	0,82	100,72	0,10	99,29	,9836	51	,89063	—	41,76	138,57	3,19	72,17	,7150
2	,82185	—	1,64	101,44	0,20	98,58	,9767	52	,89154	—	42,58	139,34	3,24	71,77	,7110
3	,82406	—	2,46	102,16	0,30	97,89	,9698	53	,89243	—	43,39	140,12	3,27	71,37	,7071
4	,82620	—	3,28	102,88	0,40	97,21	,9630	54	,89331	—	44,21	140,90	3,31	70,98	,7032
100 + 5	,82829	—	4,10	103,61	0,49	96,52	,9562	100 + 55	,89417	—	45,03	141,67	3,36	70,59	,6993
6	,83033	—	4,91	104,34	0,57	95,84	,9495	56	,89501	—	45,85	142,45	3,40	70,20	,6955
7	,83232	—	5,73	105,07	0,66	95,17	,9429	57	,89584	—	46,66	143,23	3,43	69,82	,6917
8	,83427	—	6,55	105,81	0,74	94,51	,9363	58	,89666	—	47,48	144,01	3,47	69,44	,6879
9	,83617	—	7,37	106,54	0,83	93,86	,9298	59	,89748	—	48,30	144,79	3,51	69,06	,6842
100 + 10	,83801	—	8,19	107,28	0,91	93,21	,9234	100 + 60	,89826	—	49,12	145,57	3,55	68,69	,6805
11	,83982	—	9,01	108,03	0,98	92,57	,9171	61	,89904	—	49,94	146,36	3,58	68,33	,6769
12	,84157	—	9,83	108,77	1,06	91,94	,9108	62	,89980	—	50,76	147,14	3,62	67,96	,6733
13	,84329	—	10,64	109,52	1,12	91,31	,9046	63	,90056	—	51,58	147,92	3,66	67,60	,6697
14	,84498	—	11,46	110,27	1,19	90,69	,8985	64	,90131	—	52,40	148,71	3,69	67,24	,6662
100 + 15	,84662	—	12,28	111,02	1,26	90,07	,8925	100 + 65	,90205	—	53,22	149,49	3,73	66,89	,6627
16	,84824	—	13,11	111,77	1,34	89,47	,8865	66	,90281	—	54,04	150,27	3,77	66,54	,6592
17	,84983	—	13,92	112,52	1,40	88,87	,8805	67	,90355	—	54,86	151,05	3,81	66,20	,6558
18	,85140	—	14,74	113,27	1,47	88,28	,8746	68	,90428	—	55,67	151,83	3,84	65,86	,6524
19	,85293	—	15,56	114,03	1,53	87,70	,8688	69	,90500	—	56,49	152,61	3,88	65,52	,6491
100 + 20	,85447	—	16,37	114,79	1,58	87,12	,8631	100 + 70	,90570	—	57,31	153,39	3,92	65,19	,6458
21	,85593	—	17,19	115,53	1,66	86,55	,8575	71	,90640	—	58,13	154,19	3,94	64,86	,6425
22	,85739	—	18,01	116,29	1,72	85,99	,8519	72	,90708	—	58,95	154,97	3,98	64,53	,6392
23	,85883	—	18,83	117,04	1,79	85,43	,8464	73	,90775	—	59,77	155,76	4,01	64,20	,6360
24	,86024	—	19,65	117,81	1,84	84,88	,8409	74	,90841	—	60,59	156,54	4,05	63,88	,6328
100 + 25	,86163	—	20,47	118,57	1,90	84,34	,8355	100 + 75	,90907	—	61,41	157,33	4,08	63,56	,6297
26	,86298	—	21,29	119,33	1,96	83,80	,8302	76	,90972	—	62,23	158,12	4,11	63,25	,6265
27	,86431	—	22,11	120,09	2,02	83,27	,8249	77	,91036	—	63,05	158,90	4,15	62,93	,6234
28	,86562	—	22,93	120,86	2,07	82,74	,8197	78	,91100	—	63,87	159,69	4,18	62,62	,6203
29	,86690	—	23,74	121,61	2,13	82,22	,8146	79	,91163	—	64,68	160,48	4,20	62,31	,6173
100 + 30	,86816	—	24,57	122,38	2,19	81,71	,8095	100 + 80	,91226	—	65,50	161,26	4,24	62,01	,6143
31	,86940	—	25,38	123,15	2,23	81,20	,8045	81	,91286	—	66,32	162,05	4,27	61,71	,6113
32	,87062	—	26,20	123,92	2,28	80,70	,7995	82	,91347	—	67,14	162,84	4,30	61,41	,6084
33	,87184	—	27,02	124,68	2,34	80,21	,7945	83	,91407	—	67,96	163,63	4,33	61,12	,6055
34	,87303	—	27,84	125,45	2,39	79,72	,7897	84	,91466	—	68,77	164,42	4,35	60,82	,6026
100 + 35	,87419	—	28,66	126,21	2,45	79,23	,7849	100 + 85	,91524	—	69,59	165,21	4,38	60,53	,5997
36	,87533	—	29,48	126,98	2,50	78,75	,7802	86	,91581	—	70,41	165,99	4,42	60,24	,5968
37	,87644	—	30,30	127,75	2,55	78,27	,7755	87	,91638	—	71,24	166,78	4,46	59,96	,5940
38	,87754	—	31,12	128,52	2,60	77,80	,7708	88	,91694	—	72,05	167,57	4,48	59,68	,5912
39	,87863	—	31,93	129,30	2,63	77,34	,7662	89	,91749	—	72,87	168,36	4,51	59,40	,5884
100 + 40	,87970	—	32,75	130,07	2,68	76,89	,7617	100 + 90	,91804	—	73,69	169,15	4,54	59,12	,5857
41	,88077	—	33,57	130,84	2,73	76,43	,7572	91	,91857	—	74,51	169,94	4,57	58,84	,5830
42	,88182	—	34,39	131,61	2,78	75,98	,7527	92	,91911	—	75,32	170,73	4,59	58,57	,5803
43	,88287	—	35,20	132,38	2,82	75,54	,7483	93	,91964	—	76,14	171,52	4,62	58,30	,5776
44	,88390	—	36,02	133,15	2,87	75,10	,7440	94	,92016	—	76,97	172,32	4,65	58,03	,5749
100 + 45	,88490	—	36,84	133,92	2,92	74,67	,7397	100 + 95	,92067	—	77,78	173,11	4,67	57,77	,5723
46	,88590	—	37,66	134,69	2,97	74,24	,7355	96	,92118	—	78,59	173,88	4,71	57,51	,5698
47	,88687	—	38,48	135,47	3,01	73,82	,7313	97	,92169	—	79,41	174,67	4,74	57,25	,5672
48	,88783	—	39,30	136,24	3,06	73,40	,7272	98	,92219	—	80,23	175,46	4,77	56,99	,5646
49	,88878	—	40,12	137,02	3,10	72,98	,7231	99	,92270	—	81,05	176,26	4,79	56,73	,5621

TABLE II. HEAT 76°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92320	100	81,88	177,06	4,82	56,48	,5595
99	,92370	—	82,71	177,86	4,85	56,22	,5569
98	,92420	—	83,56	178,68	4,88	55,96	,5544
97	,92469	—	84,42	179,51	4,91	55,70	,5518
96	,92519	—	85,30	180,36	4,94	55,44	,5492
100 + 95	,92569	—	86,19	181,22	4,97	55,18	,5466
94	,92619	—	87,10	182,11	4,99	54,91	,5440
93	,92669	—	88,03	183,02	5,01	54,64	,5413
92	,92720	—	88,99	183,95	5,04	54,36	,5386
91	,92771	—	89,97	184,91	5,06	54,08	,5358
100 + 90	,92822	—	90,97	185,89	5,08	53,80	,5330
89	,92874	—	91,99	186,87	5,12	53,51	,5302
88	,92927	—	93,04	187,90	5,14	53,22	,5273
87	,92980	—	94,11	188,94	5,17	52,93	,5244
86	,93034	—	95,20	190,00	5,20	52,63	,5214
100 + 85	,93089	—	96,32	191,08	5,24	52,33	,5184
84	,93145	—	97,47	192,20	5,27	52,03	,5154
83	,93201	—	98,64	193,35	5,29	51,72	,5124
82	,93258	—	99,85	194,52	5,33	51,41	,5093
81	,93314	—	101,09	195,72	5,37	51,09	,5062
100 + 80	,93370	—	102,35	196,94	5,41	50,77	,5030
79	,93427	—	103,64	198,20	5,44	50,44	,4998
78	,93483	—	104,97	199,51	5,46	50,12	,4965
77	,93540	—	106,34	200,85	5,49	49,79	,4932
76	,93597	—	107,74	202,21	5,53	49,45	,4899
100 + 75	,93653	—	109,17	203,62	5,55	49,10	,4865
74	,93712	—	110,64	205,06	5,58	48,76	,4831
73	,93770	—	112,15	206,56	5,59	48,41	,4796
72	,93825	—	113,71	208,09	5,62	48,06	,4761
71	,93888	—	115,32	209,65	5,67	47,70	,4725
100 + 70	,93949	—	116,97	211,27	5,70	47,33	,4689
69	,94010	—	118,66	212,93	5,73	46,96	,4653
68	,94072	—	120,40	214,64	5,76	46,59	,4616
67	,94134	—	122,20	216,41	5,79	46,21	,4578
66	,94197	—	124,06	218,22	5,84	45,82	,4540
100 + 65	,94262	—	125,97	220,10	5,87	45,43	,4501
64	,94325	—	127,93	222,03	5,90	45,04	,4462
63	,94389	—	129,96	224,03	5,93	44,64	,4422
62	,94454	—	132,05	226,10	5,95	44,23	,4382
61	,94520	—	134,22	228,22	6,00	43,82	,4341
100 + 60	,94585	—	136,46	230,43	6,03	43,40	,4299
59	,94651	—	138,77	232,70	6,07	42,97	,4258
58	,94718	—	141,16	235,06	6,10	42,54	,4215
57	,94785	—	143,64	237,50	6,14	42,10	,4172
56	,94852	—	146,21	240,03	6,18	41,66	,4128
100 + 55	,94920	—	148,86	242,65	6,21	41,21	,4083
54	,94986	—	151,59	245,37	6,22	40,75	,4038
53	,95053	—	154,44	248,20	6,24	40,29	,3992
52	,95121	—	157,43	251,15	6,28	39,82	,3945
51	,95188	—	160,53	254,23	6,30	39,33	,3897

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95255	100	163,76	257,40	6,36	38,85	,3849
49	,95325	—	167,10	260,71	6,39	38,36	,3800
48	,95395	—	170,58	264,17	6,41	37,85	,3750
47	,95464	—	174,21	267,78	6,43	37,34	,3700
46	,95534	—	177,99	271,54	6,45	36,82	,3649
100 + 45	,95603	—	181,95	275,46	6,49	36,30	,3596
44	,95674	—	186,09	279,57	6,52	35,77	,3544
43	,95744	—	190,42	283,89	6,53	35,22	,3490
42	,95814	—	194,95	288,41	6,54	34,67	,3435
41	,95885	—	199,71	293,15	6,56	34,11	,3379
100 + 40	,95955	—	204,70	298,11	6,59	33,54	,3323
39	,96026	—	209,95	303,34	6,61	32,96	,3266
38	,96098	—	215,47	308,86	6,61	32,37	,3208
37	,96169	—	221,29	314,67	6,62	31,77	,3148
36	,96242	—	227,44	320,81	6,63	31,17	,3088
100 + 35	,96314	—	233,94	327,31	6,63	30,55	,3027
34	,96386	—	240,82	334,19	6,63	29,92	,2965
33	,96459	—	248,12	341,50	6,62	29,28	,2901
32	,96532	—	255,88	349,27	6,61	28,63	,2836
31	,96606	—	264,13	357,53	6,60	27,97	,2771
100 + 30	,96680	—	272,93	366,32	6,61	27,30	,2704
29	,96756	—	282,34	375,75	6,59	26,61	,2637
28	,96831	—	292,43	385,86	6,57	25,91	,2568
27	,96907	—	303,25	396,72	6,53	25,21	,2498
26	,96984	—	314,92	408,40	6,52	24,49	,2426
100 + 25	,97062	—	327,52	421,02	6,50	23,75	,2353
24	,97140	—	341,17	434,70	6,47	23,00	,2279
23	,97223	—	356,00	449,56	6,44	22,24	,2204
22	,97305	—	372,18	466,78	6,40	21,47	,2127
21	,97389	—	389,90	483,54	6,36	20,68	,2049
100 + 20	,97473	—	409,40	503,09	6,31	19,88	,1969
19	,97560	—	430,94	524,69	6,25	19,06	,1888
18	,97648	—	454,89	548,69	6,20	18,22	,1806
17	,97739	—	481,65	575,51	6,14	17,37	,1722
16	,97830	—	511,75	605,68	6,07	16,51	,1636
100 + 15	,97924	—	545,87	639,88	5,99	15,63	,1548
14	,98020	—	584,86	678,96	5,90	14,73	,1459
13	,98120	—	629,85	724,04	5,81	13,81	,1368
12	,98222	—	682,34	776,62	5,72	12,87	,1276
11	,98328	—	744,37	838,76	5,61	11,92	,1181
100 + 10	,98436	—	818,80	913,28	5,52	10,95	,1085
9	,98550	—	909,78	1004,40	5,38	9,96	,0986
8	,98668	—	1023,51	1118,26	5,25	8,94	,0886
7	,98791	—	1169,77	1264,60	5,17	7,91	,0783
6	,98918	—	1364,68	1459,69	4,99	6,85	,0679
100 + 5	,99051	—	1637,62	1732,75	4,87	5,77	,0572
4	,99191	—	2047,03	2142,33	4,70	4,67	,0462
3	,99337	—	2729,36	2824,82	4,54	3,54	,0351
2	,99490	—	4094,04	4189,62	4,42	2,39	,0236
1	,99650	—	8188,08	8283,78	4,30	1,21	,0120

TABLE I. HEAT 77°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 0	,81680	100	—	100,00	—	100,00	,9901
1	,81911	—	0,82	100,72	0,10	99,29	,9830
2	,82136	—	1,64	101,44	0,20	98,59	,9761
3	,82357	—	2,46	102,16	0,30	97,89	,9692
4	,82571	—	3,28	102,88	0,40	97,21	,9624
100 + 5	,82780	—	4,10	103,61	0,49	96,52	,9556
6	,82984	—	4,91	104,34	0,57	95,84	,9490
7	,83183	—	5,73	105,07	0,66	95,17	,9423
8	,83378	—	6,55	105,81	0,74	94,51	,9357
9	,83568	—	7,36	106,54	0,82	93,86	,9292
100 + 10	,83752	—	8,18	107,28	0,91	93,21	,9229
11	,83933	—	9,00	108,02	0,98	92,57	,9166
12	,84108	—	9,82	108,77	1,05	91,94	,9103
13	,84280	—	10,64	109,51	1,13	91,31	,9041
14	,84449	—	11,46	110,26	1,20	90,69	,8980
100 + 15	,84613	—	12,28	111,01	1,27	90,08	,8919
16	,84775	—	13,10	111,76	1,34	89,47	,8859
17	,84934	—	13,91	112,51	1,40	88,87	,8800
18	,85091	—	14,73	113,27	1,46	88,28	,8741
19	,85244	—	15,55	114,02	1,53	87,70	,8683
100 + 20	,85397	—	16,36	114,78	1,58	87,12	,8626
21	,85544	—	17,18	115,53	1,65	86,55	,8570
22	,85690	—	18,00	116,29	1,71	85,99	,8514
23	,85834	—	18,82	117,04	1,78	85,44	,8459
24	,85975	—	19,64	117,80	1,84	84,89	,8404
100 + 25	,86113	—	20,46	118,56	1,90	84,34	,8350
26	,86249	—	21,28	119,32	1,96	83,80	,8297
27	,86382	—	22,10	120,09	2,01	83,27	,8244
28	,86514	—	22,92	120,85	2,07	82,75	,8192
29	,86642	—	23,73	121,61	2,12	82,23	,8141
100 + 30	,86768	—	24,56	122,38	2,18	81,72	,8090
31	,86892	—	25,36	123,14	2,22	81,21	,8040
32	,87015	—	26,19	123,91	2,28	80,71	,7990
33	,87136	—	27,01	124,67	2,34	80,21	,7941
34	,87256	—	27,83	125,44	2,39	79,72	,7893
100 + 35	,87372	—	28,65	126,20	2,45	79,23	,7845
36	,87485	—	29,46	126,97	2,49	78,75	,7797
37	,87596	—	30,28	127,74	2,54	78,27	,7750
38	,87706	—	31,10	128,51	2,59	77,81	,7704
39	,87815	—	31,92	129,29	2,63	77,35	,7658
100 + 40	,87921	—	32,74	130,06	2,68	76,89	,7613
41	,88029	—	33,56	130,83	2,73	76,43	,7568
42	,88134	—	34,37	131,60	2,77	75,99	,7523
43	,88239	—	35,19	132,37	2,82	75,55	,7479
44	,88343	—	36,01	133,14	2,87	75,11	,7436
100 + 45	,88442	—	36,83	133,91	2,92	74,68	,7393
46	,88543	—	37,64	134,68	2,96	74,25	,7351
47	,88640	—	38,46	135,46	3,00	73,82	,7309
48	,88736	—	39,28	136,23	3,05	73,40	,7268
49	,88831	—	40,10	137,01	3,09	72,99	,7227

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.							
100 + 50	,88922	100	40,92	137,78	3,14	72,58	,7186
51	,89017	—	41,74	138,56	3,18	72,17	,7146
52	,89106	—	42,56	139,33	3,23	71,77	,7106
53	,89195	—	43,37	140,11	3,26	71,37	,7067
54	,89283	—	44,19	140,89	3,30	70,98	,7028
100 + 55	,89369	—	45,01	141,66	3,35	70,59	,6989
56	,89453	—	45,83	142,44	3,39	70,21	,6951
57	,89536	—	46,64	143,22	3,42	69,82	,6913
58	,89619	—	47,46	144,00	3,46	69,44	,6875
59	,89700	—	48,28	144,78	3,50	69,06	,6838
100 + 60	,89780	—	49,10	145,56	3,54	68,69	,6801
61	,89858	—	49,92	146,35	3,57	68,33	,6766
62	,89934	—	50,74	147,13	3,61	67,96	,6730
63	,90010	—	51,56	147,91	3,65	67,60	,6694
64	,90085	—	52,38	148,69	3,69	67,25	,6659
100 + 65	,90159	—	53,19	149,48	3,71	66,90	,6623
66	,90235	—	54,02	150,26	3,76	66,55	,6589
67	,90309	—	54,84	151,04	3,80	66,20	,6555
68	,90382	—	55,65	151,81	3,84	65,86	,6521
69	,90454	—	56,47	152,60	3,87	65,53	,6488
100 + 70	,90523	—	57,28	153,38	3,90	65,19	,6454
71	,90594	—	58,11	154,17	3,94	64,86	,6422
72	,90662	—	58,92	154,96	3,96	64,53	,6389
73	,90729	—	59,74	155,75	3,99	64,20	,6357
74	,90795	—	60,56	156,53	4,03	63,88	,6325
100 + 75	,90862	—	61,38	157,31	4,07	63,57	,6293
76	,90926	—	62,20	158,11	4,09	63,25	,6262
77	,90990	—	63,02	158,89	4,13	62,93	,6231
78	,91054	—	63,84	159,67	4,17	62,62	,6200
79	,91117	—	64,65	160,46	4,19	62,32	,6170
100 + 80	,91181	—	65,47	161,24	4,23	62,02	,6140
81	,91241	—	66,29	162,04	4,25	61,71	,6110
82	,91301	—	67,11	162,82	4,29	61,41	,6081
83	,91361	—	67,92	163,61	4,31	61,13	,6052
84	,91420	—	68,74	164,40	4,34	60,83	,6023
100 + 85	,91478	—	69,56	165,19	4,37	60,54	,5994
86	,91536	—	70,38	165,98	4,40	60,25	,5965
87	,91593	—	71,20	166,76	4,44	59,97	,5937
88	,91649	—	72,02	167,55	4,47	59,68	,5909
89	,91704	—	72,84	168,34	4,50	59,40	,5881
100 + 90	,91758	—	73,66	169,13	4,53	59,13	,5854
91	,91812	—	74,48	169,92	4,56	58,85	,5827
92	,91866	—	75,29	170,71	4,58	58,58	,5800
93	,91920	—	76,11	171,50	4,61	58,31	,5773
94	,91972	—	76,93	172,29	4,64	58,04	,5747
100 + 95	,92023	—	77,75	173,08	4,67	57,77	,5720
96	,92074	—	78,56	173,86	4,70	57,51	,5695
97	,92125	—	79,37	174,65	4,72	57,26	,5669
98	,92175	—	80,20	175,44	4,76	57,00	,5643
99	,92226	—	81,01	176,23	4,78	56,74	,5618

TABLE II. HEAT 77°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92275	100	81,84	177,04	4,80	56,48	,5592	100 + 50	,95219	100	163,68	257,34	6,34	38,86	,3847
99	,92326	—	82,67	177,84	4,83	56,23	,5567	49	,95289	—	167,02	260,64	6,38	38,36	,3798
98	,92375	—	83,52	178,66	4,86	55,97	,5541	48	,95359	—	170,50	264,11	6,39	37,86	,3748
97	,92425	—	84,38	179,49	4,89	55,71	,5516	47	,95429	—	174,13	267,71	6,42	37,35	,3698
96	,92475	—	85,26	180,34	4,92	55,44	,5490	46	,95500	—	177,91	271,46	6,45	36,83	,3647
100 + 95	,92525	—	86,15	181,20	4,95	55,18	,5464	100 + 45	,95569	—	181,86	275,39	6,47	36,31	,3595
94	,92575	—	87,06	182,09	4,97	54,92	,5437	44	,95640	—	186,00	279,50	6,50	35,77	,3542
93	,92625	—	87,99	183,00	4,99	54,65	,5410	43	,95710	—	190,33	283,81	6,52	35,23	,3489
92	,92676	—	88,95	183,93	5,02	54,37	,5383	42	,95781	—	194,86	288,34	6,52	34,68	,3434
91	,92727	—	89,93	184,89	5,04	54,08	,5355	41	,95852	—	199,61	293,07	6,54	34,12	,3378
100 + 90	,92778	—	90,93	185,86	5,07	53,80	,5327	100 + 40	,95922	—	204,60	298,05	6,57	33,55	,3322
89	,92830	—	91,95	186,84	5,11	53,51	,5299	39	,95994	—	209,85	303,26	6,59	32,97	,3265
88	,92883	—	93,00	187,87	5,13	53,23	,5270	38	,96066	—	215,37	308,77	6,60	32,38	,3207
87	,92937	—	94,07	188,91	5,16	52,94	,5241	37	,96138	—	221,19	314,59	6,60	31,78	,3147
86	,92991	—	95,16	189,97	5,19	52,64	,5212	36	,96211	—	227,34	320,72	6,62	31,18	,3087
100 + 85	,93046	—	96,28	191,05	5,23	52,34	,5182	100 + 35	,96280	—	233,83	327,21	6,62	30,56	,3026
84	,93102	—	97,43	192,17	5,26	52,04	,5152	34	,96356	—	240,71	334,09	6,62	29,93	,2964
83	,93158	—	98,60	193,32	5,28	51,73	,5121	33	,96429	—	248,00	341,40	6,60	29,29	,2900
82	,93215	—	99,80	194,48	5,32	51,42	,5090	32	,96503	—	255,76	349,16	6,60	28,64	,2835
81	,93272	—	101,04	195,68	5,36	51,10	,5059	31	,96577	—	264,01	357,41	6,60	27,98	,2770
100 + 80	,93327	—	102,30	196,91	5,39	50,78	,5028	100 + 30	,96652	—	272,80	366,20	6,60	27,31	,2704
79	,93385	—	103,59	198,17	5,42	50,45	,4996	29	,96728	—	282,21	375,63	6,58	26,62	,2636
78	,93441	—	104,92	199,47	5,45	50,12	,4963	28	,96804	—	292,29	385,73	6,56	25,92	,2567
77	,93498	—	106,29	200,81	5,48	49,80	,4930	27	,96881	—	303,11	396,58	6,53	25,22	,2497
76	,93555	—	107,69	202,18	5,51	49,46	,4897	26	,96958	—	314,77	408,25	6,52	24,50	,2426
100 + 75	,93611	—	109,12	203,59	5,53	49,11	,4863	100 + 25	,97038	—	327,37	420,87	6,50	23,76	,2352
74	,93670	—	110,59	205,03	5,56	48,77	,4829	24	,97117	—	341,01	434,54	6,47	23,01	,2279
73	,93728	—	112,10	206,52	5,58	48,42	,4794	23	,97199	—	355,83	449,39	6,44	22,25	,2203
72	,93784	—	113,66	208,06	5,60	48,07	,4759	22	,97282	—	372,00	466,06	6,40	21,48	,2126
71	,93847	—	115,27	209,62	5,65	47,70	,4723	21	,97366	—	389,72	483,35	6,37	20,69	,2048
100 + 70	,93908	—	116,92	211,24	5,68	47,34	,4687	100 + 20	,97451	—	409,21	502,89	6,32	19,89	,1969
69	,93969	—	118,60	212,90	5,70	46,97	,4651	19	,97538	—	430,74	524,48	6,26	19,07	,1888
68	,94031	—	120,35	214,60	5,75	46,59	,4614	18	,97627	—	454,67	548,47	6,20	18,23	,1805
67	,94094	—	122,14	216,37	5,77	46,22	,4576	17	,97718	—	481,42	575,28	6,14	17,38	,1721
66	,94157	—	124,00	218,18	5,82	45,83	,4538	16	,97810	—	511,51	605,43	6,08	16,52	,1636
100 + 65	,94222	—	125,91	220,05	5,86	45,44	,4499	100 + 15	,97905	—	545,01	639,01	6,00	15,63	,1548
64	,94285	—	127,87	221,99	5,88	45,04	,4460	14	,98003	—	584,58	678,68	5,90	14,73	,1459
63	,94350	—	129,90	223,98	5,92	44,64	,4421	13	,98101	—	629,56	723,73	5,83	13,81	,1308
62	,94415	—	131,99	226,05	5,94	44,23	,4380	12	,98203	—	682,02	776,29	5,73	12,88	,1275
61	,94481	—	134,10	228,18	5,98	43,82	,4339	11	,98310	—	744,02	838,40	5,62	11,93	,1181
100 + 60	,94540	—	136,39	230,38	6,01	43,41	,4297	100 + 10	,98418	—	818,42	912,89	5,53	10,95	,1085
59	,94613	—	138,70	232,65	6,05	42,98	,4256	9	,98533	—	909,36	1003,96	5,40	9,96	,0986
58	,94680	—	141,09	235,01	6,08	42,55	,4213	8	,98651	—	1023,03	1117,76	5,27	8,95	,0886
57	,94747	—	143,57	237,45	6,12	42,11	,4170	7	,98775	—	1169,21	1264,03	5,18	7,91	,0783
56	,94810	—	146,14	239,98	6,16	41,67	,4126	6	,98902	—	1364,04	1459,02	5,02	6,85	,0679
100 + 55	,94882	—	148,79	242,60	6,19	41,21	,4081	100 + 5	,99036	—	1630,85	1731,95	4,90	5,77	,0572
54	,94948	—	151,52	245,31	6,21	40,76	,4036	4	,99176	—	2046,06	2141,34	4,72	4,67	,0462
53	,95016	—	154,37	248,15	6,22	40,30	,3990	3	,99323	—	2728,08	2823,50	4,58	3,54	,0351
52	,95084	—	157,36	251,09	6,27	39,83	,3943	2	,99476	—	4092,12	4187,66	4,46	2,39	,0236
51	,95151	—	160,45	254,18	6,27	39,34	,3895	1	,99636	—	8184,23	8279,90	4,33	1,21	,0120

TABLE I. HEAT 78°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,81630	100	—	100,00	—	100,00	,9894	100 + 50	,88875	100	40,90	137,77	3,13	72,59	,7182
1	,81861	—	0,82	100,72	0,10	99,29	,9824	51	,88969	—	41,72	138,55	3,17	72,18	,7142
2	,82086	—	1,64	101,44	0,20	98,59	,9755	52	,89059	—	42,54	139,32	3,22	71,78	,7102
3	,82308	—	2,46	102,16	0,30	97,89	,9686	53	,89148	—	43,35	140,10	3,25	71,38	,7063
4	,82522	—	3,28	102,88	0,40	97,21	,9618	54	,89235	—	44,17	140,88	3,29	70,99	,7024
100 + 5	,82730	—	4,09	103,60	0,49	96,52	,9551	100 + 55	,89321	—	44,99	141,65	3,34	70,60	,6985
6	,82935	—	4,91	104,34	0,57	95,85	,9484	56	,89406	—	45,81	142,43	3,38	70,21	,6947
7	,83134	—	5,73	105,07	0,66	95,18	,9418	57	,89489	—	46,62	143,21	3,41	69,83	,6909
8	,83328	—	6,55	105,81	0,74	94,52	,9352	58	,89572	—	47,44	143,99	3,45	69,45	,6872
9	,83518	—	7,36	106,54	0,82	93,86	,9287	59	,89653	—	48,26	144,77	3,49	69,07	,6835
100 + 10	,83702	—	8,18	107,28	0,90	93,21	,9223	100 + 60	,89733	—	49,08	145,55	3,53	68,70	,6798
11	,83883	—	9,00	108,02	0,98	92,57	,9160	61	,89811	—	49,89	146,33	3,56	68,34	,6762
12	,84059	—	9,82	108,77	1,05	91,94	,9098	62	,89888	—	50,71	147,11	3,60	67,97	,6726
13	,84231	—	10,63	109,51	1,12	91,31	,9035	63	,89964	—	51,53	147,89	3,64	67,61	,6690
14	,84400	—	11,45	110,26	1,19	90,69	,8974	64	,90039	—	52,35	148,68	3,67	67,26	,6655
100 + 15	,84564	—	12,27	111,01	1,26	90,08	,8914	100 + 65	,90113	—	53,16	149,46	3,70	66,91	,6620
16	,84727	—	13,09	111,76	1,33	89,47	,8854	66	,90188	—	53,99	150,24	3,75	66,56	,6586
17	,84886	—	13,91	112,51	1,40	88,88	,8795	67	,90262	—	54,81	151,02	3,79	66,21	,6552
18	,85042	—	14,73	113,26	1,47	88,28	,8736	68	,90336	—	55,62	151,80	3,82	65,87	,6518
19	,85195	—	15,54	114,02	1,52	87,70	,8678	69	,90407	—	56,44	152,58	3,86	65,54	,6484
100 + 20	,85347	—	16,35	114,78	1,57	87,13	,8622	100 + 70	,90477	—	57,26	153,36	3,90	65,20	,6451
21	,85495	—	17,18	115,53	1,65	86,56	,8565	71	,90547	—	58,08	154,16	3,92	64,87	,6419
22	,85641	—	18,00	116,29	1,71	85,99	,8509	72	,90615	—	58,89	154,94	3,95	64,54	,6386
23	,85784	—	18,82	117,04	1,78	85,44	,8454	73	,90683	—	59,71	155,73	3,98	64,22	,6354
24	,85926	—	19,63	117,80	1,83	84,89	,8400	74	,90749	—	60,53	156,51	4,02	63,89	,6322
100 + 25	,86064	—	20,45	118,56	1,89	84,34	,8346	100 + 75	,90816	—	61,35	157,29	4,06	63,57	,6290
26	,86200	—	21,27	119,32	1,95	83,80	,8293	76	,90880	—	62,17	158,09	4,08	63,26	,6259
27	,86333	—	22,09	120,08	2,01	83,27	,8240	77	,90945	—	62,99	158,87	4,12	62,94	,6228
28	,86465	—	22,90	120,84	2,06	82,75	,8188	78	,91008	—	63,81	159,65	4,16	62,63	,6197
29	,86594	—	23,72	121,60	2,12	82,23	,8137	79	,91071	—	64,62	160,44	4,18	62,33	,6167
100 + 30	,86719	—	24,54	122,37	2,17	81,72	,8086	100 + 80	,91136	—	65,44	161,22	4,22	62,02	,6137
31	,86844	—	25,35	123,14	2,21	81,21	,8036	81	,91195	—	66,26	162,02	4,24	61,72	,6107
32	,86967	—	26,18	123,91	2,27	80,71	,7986	82	,91255	—	67,08	162,81	4,27	61,43	,6078
33	,87089	—	26,99	124,67	2,32	80,22	,7937	83	,91315	—	67,89	163,59	4,30	61,13	,6049
34	,87208	—	27,81	125,44	2,37	79,73	,7889	84	,91374	—	68,71	164,38	4,33	60,83	,6020
100 + 35	,87324	—	28,64	126,20	2,44	79,24	,7841	100 + 85	,91432	—	69,53	165,17	4,36	60,54	,5991
36	,87437	—	29,45	126,97	2,48	78,76	,7793	86	,91490	—	70,35	165,96	4,39	60,26	,5962
37	,87548	—	30,27	127,73	2,54	78,28	,7746	87	,91547	—	71,17	166,74	4,43	59,98	,5934
38	,87658	—	31,09	128,51	2,58	77,81	,7700	88	,91603	—	71,98	167,53	4,45	59,69	,5906
39	,87767	—	31,90	129,28	2,62	77,35	,7654	89	,91659	—	72,80	168,32	4,48	59,41	,5878
100 + 40	,87873	—	32,72	130,06	2,66	76,89	,7609	100 + 90	,91713	—	73,62	169,11	4,51	59,13	,5851
41	,87981	—	33,54	130,83	2,71	76,44	,7564	91	,91767	—	74,44	169,90	4,54	58,86	,5824
42	,88086	—	34,36	131,59	2,77	75,99	,7519	92	,91821	—	75,25	170,69	4,56	58,59	,5797
43	,88191	—	35,17	132,36	2,81	75,55	,7475	93	,91875	—	76,08	171,48	4,60	58,32	,5770
44	,88295	—	35,99	133,13	2,86	75,11	,7432	94	,91928	—	76,90	172,27	4,63	58,05	,5744
100 + 45	,88395	—	36,81	133,90	2,91	74,68	,7389	100 + 95	,91979	—	77,71	173,06	4,65	57,78	,5717
46	,88496	—	37,62	134,67	2,95	74,25	,7347	96	,92030	—	78,52	173,83	4,69	57,52	,5692
47	,88593	—	38,44	135,45	2,99	73,83	,7305	97	,92081	—	79,33	174,63	4,70	57,26	,5666
48	,88689	—	39,26	136,22	3,04	73,41	,7264	98	,92131	—	80,16	175,42	4,74	57,00	,5641
49	,88784	—	40,08	137,00	3,08	73,00	,7223	99	,92182	—	80,97	176,20	4,77	56,75	,5616

TABLE II. HEAT 78°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92230	100	81,80	177,01	4,79	56,49	,5590	100 + 50	,95183	100	163,60	257,28	6,32	38,87	,3846
99	,92281	—	82,63	177,81	4,82	56,23	,5564	49	,95253	—	166,94	260,58	6,36	38,37	,3797
98	,92331	—	83,48	178,63	4,85	55,97	,5539	48	,95323	—	170,42	264,04	6,38	37,87	,3747
97	,92381	—	84,34	179,46	4,88	55,71	,5513	47	,95394	—	174,05	267,64	6,41	37,36	,3697
96	,92431	—	85,22	180,31	4,91	55,45	,5488	46	,95465	—	177,83	271,39	6,44	36,84	,3646
100 + 95	,92481	—	86,11	181,17	4,94	55,19	,5461	100 + 45	,95535	—	181,78	275,32	6,46	36,32	,3594
94	,92531	—	87,02	182,07	4,95	54,93	,5434	44	,95606	—	185,91	279,43	6,48	35,78	,3541
93	,92581	—	87,95	182,97	4,98	54,65	,5407	43	,95677	—	190,24	283,74	6,50	35,24	,3488
92	,92632	—	88,91	183,90	5,01	54,37	,5380	42	,95748	—	194,77	288,26	6,51	34,69	,3433
91	,92683	—	89,89	184,86	5,03	54,09	,5352	41	,95819	—	199,52	292,99	6,53	34,13	,3377
100 + 90	,92734	—	90,89	185,84	5,05	53,81	,5324	100 + 40	,95890	—	204,51	297,95	6,56	33,56	,3321
89	,92786	—	91,91	186,81	5,10	53,52	,5296	39	,95962	—	209,75	303,18	6,57	32,98	,3264
88	,92840	—	92,95	187,84	5,11	53,24	,5267	38	,96034	—	215,27	308,69	6,58	32,39	,3206
87	,92894	—	94,02	188,88	5,14	52,95	,5238	37	,96107	—	221,08	314,50	6,58	31,79	,3146
86	,92948	—	95,11	189,94	5,17	52,65	,5209	36	,96180	—	227,23	320,64	6,59	31,19	,3086
100 + 85	,93003	—	96,23	191,03	5,20	52,35	,5179	100 + 35	,96250	—	233,72	327,11	6,61	30,57	,3025
84	,93059	—	97,38	192,14	5,24	52,05	,5149	34	,96326	—	240,59	333,99	6,60	29,94	,2963
83	,93115	—	98,55	193,28	5,27	51,74	,5119	33	,96400	—	247,89	341,30	6,59	29,30	,2900
82	,93172	—	99,75	194,45	5,30	51,42	,5088	32	,96474	—	255,64	349,05	6,59	28,65	,2835
81	,93229	—	101,00	195,65	5,35	51,11	,5057	31	,96549	—	263,88	357,30	6,58	27,99	,2770
100 + 80	,93285	—	102,25	196,87	5,38	50,79	,5025	100 + 30	,96624	—	272,67	366,08	6,59	27,32	,2703
79	,93343	—	103,54	198,13	5,41	50,46	,4994	29	,96700	—	282,08	375,50	6,58	26,63	,2635
78	,93399	—	104,87	199,44	5,43	50,13	,4961	28	,96777	—	292,15	385,60	6,55	25,93	,2566
77	,93456	—	106,24	200,78	5,46	49,81	,4928	27	,96855	—	302,97	396,44	6,53	25,23	,2496
76	,93513	—	107,64	202,14	5,50	49,47	,4895	26	,96933	—	314,62	408,10	6,52	24,50	,2425
100 + 75	,93570	—	109,07	203,55	5,52	49,12	,4861	100 + 25	,97013	—	327,21	420,72	6,49	23,77	,2352
74	,93629	—	110,54	205,00	5,54	48,78	,4827	24	,97093	—	340,85	434,38	6,47	23,02	,2278
73	,93687	—	112,05	206,48	5,57	48,43	,4792	23	,97175	—	355,66	449,22	6,44	22,26	,2203
72	,93743	—	113,61	208,02	5,59	48,08	,4757	22	,97259	—	371,83	466,43	6,40	21,49	,2126
71	,93806	—	115,21	209,58	5,63	47,71	,4721	21	,97343	—	389,54	483,17	6,37	20,69	,2048
100 + 70	,93867	—	116,86	211,20	5,66	47,35	,4685	100 + 20	,97429	—	409,02	502,70	6,32	19,89	,1968
69	,93928	—	118,54	212,86	5,68	46,98	,4649	19	,97516	—	430,54	524,27	6,27	19,07	,1887
68	,93991	—	120,29	214,56	5,73	46,60	,4612	18	,97606	—	454,46	548,26	6,20	18,23	,1805
67	,94054	—	122,08	216,33	5,75	46,23	,4574	17	,97697	—	481,20	575,05	6,15	17,39	,1721
66	,94117	—	123,94	218,14	5,80	45,84	,4536	16	,97790	—	511,27	605,18	6,09	16,53	,1635
100 + 65	,94182	—	125,85	220,01	5,84	45,45	,4497	100 + 15	,97885	—	545,35	639,35	6,00	15,64	,1548
64	,94246	—	127,81	221,95	5,86	45,05	,4458	14	,97983	—	584,30	678,40	5,90	14,74	,1459
63	,94311	—	129,84	223,94	5,90	44,65	,4419	13	,98082	—	629,26	723,42	5,84	13,82	,1368
62	,94376	—	131,93	226,00	5,93	44,24	,4378	12	,98185	—	681,70	775,96	5,74	12,88	,1275
61	,94442	—	134,10	228,13	5,97	43,83	,4337	11	,98292	—	743,67	838,04	5,63	11,93	,1181
100 + 60	,94508	—	136,33	230,33	6,00	43,42	,4296	100 + 10	,98401	—	818,03	912,49	5,54	10,96	,1084
59	,94575	—	138,64	232,60	6,04	42,99	,4254	9	,98516	—	908,93	1003,52	5,41	9,97	,0986
58	,94642	—	141,02	234,96	6,06	42,56	,4211	8	,98635	—	1022,55	1117,26	5,29	8,95	,0886
57	,94709	—	143,50	237,40	6,10	42,12	,4168	7	,98759	—	1168,65	1263,46	5,19	7,91	,0783
56	,94776	—	146,07	239,93	6,14	41,68	,4124	6	,98887	—	1363,40	1458,35	5,05	6,86	,0678
100 + 55	,94844	—	148,72	242,55	6,17	41,22	,4079	100 + 5	,99021	—	1636,08	1731,16	4,92	5,78	,0572
54	,94911	—	151,45	245,26	6,19	40,77	,4034	4	,99161	—	2045,10	2140,35	4,75	4,67	,0462
53	,94979	—	154,30	248,09	6,21	40,31	,3988	3	,99308	—	2727,80	2822,19	4,61	3,54	,0351
52	,95047	—	157,28	251,04	6,24	39,83	,3941	2	,99462	—	4090,20	4185,70	4,50	2,39	,0236
51	,95115	—	160,38	254,13	6,25	39,35	,3894	1	,99622	—	8180,39	8276,03	4,36	1,21	,0120

TABLE I. HEAT 79°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,81580	100	—	100,00	—	100,00	,9888	100 + 50	,88829	100	40,88	137,76	3,12	72,59	,7178
1	,81581	—	0,82	100,71	0,11	99,29	,9818	51	,88921	—	41,70	138,54	3,16	72,18	,7138
2	,82037	—	1,63	101,43	0,20	98,59	,9749	52	,89011	—	42,52	139,31	3,21	71,78	,7098
3	,82258	—	2,45	102,15	0,30	97,89	,9680	53	,89100	—	43,33	140,09	3,24	71,39	,7059
4	,82472	—	3,27	102,87	0,40	97,21	,9612	54	,89187	—	44,15	140,87	3,28	71,00	,7020
100 + 5	,82681	—	4,09	103,60	0,49	96,52	,9545	100 + 55	,89273	—	44,97	141,64	3,33	70,60	,6981
6	,82885	—	4,90	104,33	0,57	95,85	,9478	56	,89358	—	45,79	142,42	3,37	70,21	,6943
7	,83084	—	5,72	105,06	0,66	95,18	,9412	57	,89442	—	46,60	143,20	3,40	69,83	,6905
8	,83278	—	6,54	105,80	0,74	94,52	,9346	58	,89525	—	47,42	143,98	3,44	69,45	,6868
9	,83468	—	7,35	106,53	0,82	93,86	,9281	59	,89606	—	48,24	144,76	3,48	69,07	,6831
100 + 10	,83652	—	8,18	107,27	0,91	93,22	,9218	100 + 60	,89686	—	49,06	145,54	3,52	68,70	,6794
11	,83833	—	9,00	108,02	0,98	92,58	,9155	61	,89765	—	49,87	146,32	3,55	68,34	,6759
12	,84010	—	9,81	108,76	1,05	91,95	,9093	62	,89842	—	50,69	147,10	3,59	67,97	,6723
13	,84182	—	10,63	109,50	1,13	91,32	,9030	63	,89918	—	51,51	147,88	3,63	67,61	,6687
14	,84351	—	11,45	110,26	1,19	90,70	,8969	64	,89993	—	52,32	148,66	3,66	67,26	,6651
100 + 15	,84516	—	12,27	111,01	1,26	90,09	,8908	100 + 65	,90067	—	53,14	149,45	3,69	66,91	,6617
16	,84678	—	13,09	111,76	1,33	89,48	,8848	66	,90142	—	53,96	150,23	3,73	66,56	,6583
17	,84837	—	13.90	112,51	1,39	88,88	,8790	67	,90216	—	54,78	151,01	3,77	66,21	,6549
18	,84993	—	14,72	113,26	1,46	88,29	,8731	68	,90289	—	55,59	151,79	3,80	65,87	,6515
19	,85146	—	15.54	114,02	1,52	87,70	,8673	69	,90361	—	56,41	152,57	3,84	65,54	,6482
100 + 20	,85298	—	16,35	114,78	1,57	87,13	,8617	100 + 70	,90431	—	57,23	153,35	3,88	65,21	,6448
21	,85446	—	17,17	115,52	1,65	86,56	,8560	71	,90501	—	58,05	154,15	3,90	64,87	,6416
22	,85592	—	17.99	116,28	1,71	86,00	,8504	72	,90569	—	58,86	154,92	3,94	64,54	,6383
23	,85735	—	18,81	117,03	1,78	85,45	,8449	73	,90637	—	59,68	155,71	3,97	64,22	,6351
24	,85877	—	19,62	117,79	1,83	84,90	,8395	74	,90703	—	60,50	156,49	4,01	63,90	,6319
100 + 25	,86015	—	20,44	118,55	1.89	84,35	,8341	100 + 75	,90770	—	61,32	157,28	4,04	63,58	,6287
26	,86151	—	21,26	119,31	1,95	83,81	,8288	76	,90834	—	62,14	158,07	4,07	63,26	,6256
27	,86284	—	22,08	120,08	2,00	83,28	,8235	77	,90899	—	62,96	158,85	4,11	62,95	,6225
28	,86416	—	22,89	120,84	2,05	82,76	,8183	78	,90963	—	63,78	159,63	4,15	62,64	,6194
29	,86545	—	23.71	121,60	2,11	82,24	,8132	79	,91026	—	64,59	160,42	4,17	62,33	,6164
100 + 30	,86670	—	24,53	122,37	2,16	81,73	,8081	100 + 80	,91091	—	65,41	161,20	4,21	62,03	,6134
31	,86796	—	25,34	123,13	2,21	81,22	,8031	81	,91149	—	66,23	162,00	4,23	61,73	,6104
32	,86920	—	26,16	123,90	2,26	80,72	,7982	82	,91209	—	67,05	162,79	4,26	61,43	,6075
33	,87041	—	26,98	124,66	2,32	80,22	,7932	83	,91269	—	67,86	163,57	4,29	61,14	,6046
34	,87160	—	27,80	125,43	2,37	79,73	,7884	84	,91328	—	68,68	164,36	4,32	60,84	,6017
100 + 35	,87276	—	28,62	126,19	2,43	79,24	,7836	100 + 85	,91386	—	69,50	165,15	4,35	60,55	,5988
36	,87389	—	29,43	126,96	2,47	78,76	,7789	86	,91444	—	70,31	165,94	4,37	60,26	,5959
37	,87500	—	30,25	127,73	2,52	78,28	,7742	87	,91501	—	71,13	166,72	4,41	59,98	,5931
38	,87610	—	31,07	128,50	2,57	77,82	,7696	88	,91557	—	71,95	167,51	4,44	59,69	,5903
39	,87719	—	31.89	129,27	2,62	77,36	,7650	89	,91613	—	72,77	168,30	4,47	59,41	,5875
100 + 40	,87824	—	32,71	130,05	2,66	76,90	,7605	100 + 90	,91668	—	73,59	169,09	4,50	59,14	,5848
41	,87933	—	33,53	130,82	2,71	76,44	,7560	91	,91722	—	74,40	169,88	4,52	58,86	,5821
42	,88038	—	34,34	131,58	2,76	76,00	,7515	92	,91776	—	75,22	170,67	4,55	58,59	,5794
43	,88143	—	35.16	132,35	2,81	75,56	,7471	93	,91830	—	76,04	171,46	4,58	58,32	,5767
44	,88247	—	35,97	133,12	2,85	75,12	,7428	94	,91883	—	76,86	172,24	4,62	58,05	,5741
100 + 45	,88348	—	36,80	133,89	2,91	74,69	,7385	100 + 95	,91935	—	77,68	173,03	4,65	57,79	,5715
46	,88448	—	37,60	134,66	2,94	74,26	,7343	96	,91986	—	78,48	173,81	4,67	57,53	,5689
47	,88546	—	38,42	135,44	2,98	73,83	,7301	97	,92037	—	79,29	174,61	4,68	57,27	,5663
48	,88642	—	39,24	136,21	3,03	73,41	,7260	98	,92087	—	80,12	175,40	4,72	57,01	,5638
49	,88736	—	40,06	136,99	3,07	73,00	,7219	99	,92138	—	80,93	176,18	4,75	56,75	,5613

TABLE II. HEAT 79°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.								W. + Sp.							
100 + 100	,92186	100	81,76	176,98	4,78	56,50	,5587	100 + 50	,95147	100	163,52	257,22	6,30	38,88	,3845
99	,92237	—	82,59	177,79	4,80	56,24	,5562	49	,95217	—	166,86	260,52	5,34	38,38	,3796
98	,92286	—	83,44	178,61	4,83	55,98	,5536	48	,95288	—	170,34	263,97	6,37	37,88	,3746
97	,92337	—	84,30	179,44	4,86	55,72	,5511	47	,95359	—	173,97	267,57	6,40	37,37	,3696
96	,92387	—	85,18	180,29	4,89	55,46	,5485	46	,95430	—	177,74	271,32	6,42	36,85	,3645
100 + 95	,92437	—	86,07	181,15	4,92	55,20	,5459	100 + 45	,95501	—	181,69	275,25	6,44	36,33	,3593
94	,92487	—	86,98	182,04	4,94	54,93	,5432	44	,95572	—	185,82	279,36	6,46	35,79	,3540
93	,92537	—	87,91	182,95	4,96	54,66	,5405	43	,95644	—	190,15	283,67	6,48	35,25	,3487
92	,92588	—	88,87	183,88	4,99	54,38	,5378	42	,95715	—	194,68	288,19	6,49	34,70	,3432
91	,92639	—	89,85	184,84	5,01	54,10	,5350	41	,95787	—	199,43	292,91	6,52	34,14	,3376
100 + 90	,92690	—	90,85	185,81	5,04	53,82	,5322	100 + 40	,95858	—	204,41	297,87	6,54	33,57	,3320
89	,92743	—	91,87	186,79	5,08	53,53	,5294	39	,95930	—	209,65	303,10	6,55	32,99	,3263
88	,92797	—	92,91	187,81	5,10	53,25	,5265	38	,96003	—	215,17	308,60	6,57	32,40	,3205
87	,92851	—	93,98	188,85	5,13	52,95	,5236	37	,96076	—	220,98	314,42	6,56	31,80	,3145
86	,92905	—	95,07	189,91	5,16	52,65	,5207	36	,96149	—	227,13	320,56	6,57	31,20	,3085
100 + 85	,92960	—	96,19	191,00	5,19	52,35	,5177	100 + 35	,96220	—	233,61	327,01	6,60	30,58	,3024
84	,93016	—	97,33	192,11	5,22	52,05	,5147	34	,96296	—	240,48	333,89	6,59	29,95	,2962
83	,93072	—	98,50	193,25	5,25	51,75	,5117	33	,96371	—	247,77	341,20	6,57	29,31	,2899
82	,93129	—	99,70	194,42	5,28	51,43	,5086	32	,96445	—	255,52	348,94	6,58	28,66	,2834
81	,93187	—	100,95	195,62	5,33	51,12	,5055	31	,96521	—	263,76	357,18	6,58	28,00	,2769
100 + 80	,93243	—	102,20	196,84	5,36	50,80	,5023	100 + 30	,96596	—	272,54	365,96	6,58	27,33	,2702
79	,93301	—	103,49	198,10	5,39	50,47	,4992	29	,96673	—	281,95	375,38	6,57	26,64	,2635
78	,93357	—	104,82	199,40	5,42	50,14	,4959	28	,96750	—	292,01	385,47	6,54	25,94	,2566
77	,93414	—	106,19	200,74	5,45	49,81	,4926	27	,96829	—	302,83	396,30	6,53	25,23	,2496
76	,93472	—	107,59	202,11	5,48	49,47	,4893	26	,96908	—	314,47	407,95	6,52	24,51	,2424
100 + 75	,93529	—	109,02	203,51	5,51	49,13	,4859	100 + 25	,96988	—	327,06	420,57	6,49	23,78	,2351
74	,93588	—	110,49	204,96	5,53	48,79	,4825	24	,97069	—	340,69	434,22	6,47	23,03	,2278
73	,93646	—	112,00	206,45	5,55	48,44	,4790	23	,97151	—	355,49	449,06	6,43	22,27	,2203
72	,93702	—	113,55	207,98	5,57	48,08	,4755	22	,97236	—	371,66	466,26	6,40	21,49	,2125
71	,93765	—	115,15	209,54	5,61	47,72	,4719	21	,97321	—	389,36	482,99	6,37	20,70	,2047
100 + 70	,93826	—	116,80	211,16	5,64	47,36	,4683	100 + 20	,97407	—	408,83	502,51	6,32	19,90	,1968
69	,93888	—	118,49	212,82	5,67	46,99	,4647	19	,97494	—	430,34	524,07	6,27	19,08	,1887
68	,93951	—	120,23	214,52	5,71	46,61	,4610	18	,97585	—	454,25	548,04	6,21	18,24	,1804
67	,94014	—	122,02	216,29	5,73	46,23	,4572	17	,97676	—	480,97	574,82	6,15	17,39	,1720
66	,94077	—	123,88	218,10	5,78	45,85	,4534	16	,97770	—	511,03	604,94	6,09	16,53	,1635
100 + 65	,94142	—	125,79	219,97	5,82	45,46	,4495	100 + 15	,97865	—	545,10	639,09	6,01	15,65	,1547
64	,94207	—	127,75	221,91	5,84	45,06	,4456	14	,97963	—	584,03	678,12	5,91	14,75	,1458
63	,94272	—	129,78	223,90	5,88	44,66	,4417	13	,98063	—	628,97	723,12	5,85	13,83	,1367
62	,94337	—	131,87	225,96	5,91	44,25	,4376	12	,98167	—	681,38	775,63	5,75	12,89	,1275
61	,94403	—	134,04	228,09	5,95	43,84	,4336	11	,98274	—	743,32	837,68	5,64	11,94	,1180
100 + 60	,94469	—	136,27	230,28	5,99	43,43	,4294	100 + 10	,98384	—	817,65	912,10	5,55	10,96	,1084
59	,94537	—	138,57	232,55	6,02	43,00	,4252	9	,98499	—	908,51	1003,08	5,43	9,97	,0986
58	,94604	—	140,95	234,91	6,04	42,57	,4209	8	,98619	—	1022,07	1116,76	5,31	8,95	,0886
57	,94671	—	143,43	237,35	6,08	42,13	,4166	7	,98743	—	1168,09	1262,89	5,20	7,92	,0783
56	,94738	—	146,00	239,88	6,12	41,69	,4122	6	,98872	—	1362,76	1457,69	5,07	6,86	,0678
100 + 55	,94806	—	148,65	242,50	6,15	41,23	,4078	100 + 5	,99006	—	1635,31	1730,37	4,94	5,78	,0571
54	,94874	—	151,38	245,21	6,17	40,78	,4033	4	,99146	—	2044,14	2139,35	4,79	4,67	,0462
53	,94942	—	154,23	248,04	6,19	40,32	,3987	3	,99293	—	2725,51	2820,86	4,65	3,54	,0351
52	,95010	—	157,21	250,98	6,23	39,84	,3940	2	,99447	—	4088,27	4183,74	4,53	2,39	,0236
51	,95079	—	160,31	254,06	6,25	39,36	,3893	1	,99607	—	8176,55	8272,15	4,40	1,21	,0120

TABLE I. HEAT 80°.

I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.	I. Spirit and water by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
Sp. + W.								Sp. + W.							
100 + 0	,81530	100	—	100,00	—	100,00	,9882	100 + 50	,88781	100	40,86	137,75	3,11	72,60	,7174
1	,81761	—	0,82	100,71	0,11	99,29	,9812	51	,88873	—	41,68	138,53	3,15	72,19	,7134
2	,81987	—	1,63	101,43	0,20	98,59	,9743	52	,88963	—	42,50	139,30	3,20	71,79	,7094
3	,82207	—	2,45	102,15	0,30	97,89	,9674	53	,89052	—	43,31	140,08	3,23	71,40	,7055
4	,82422	—	3,27	102,87	0,40	97,21	,9606	54	,89139	—	44,13	140,86	3,27	71,01	,7016
100 + 5	,82631	—	4,09	103,60	0,49	96,52	,9539	100 + 55	,89225	—	44,95	141,63	3,32	70,61	,6977
6	,82835	—	4,90	104,33	0,57	95,85	,9472	56	,89310	—	45,77	142,41	3,36	70,22	,6939
7	,83034	—	5,72	105,06	0,66	95,18	,9406	57	,89394	—	46,58	143,19	3,39	69,84	,6901
8	,83228	—	6,54	105,80	0,74	94,52	,9340	58	,89477	—	47,40	143,97	3,43	69,46	,6864
9	,83418	—	7,35	106,53	0,82	93,86	,9275	59	,89559	—	48,22	144,75	3,47	69,08	,6827
100 + 10	,83603	—	8,17	107,27	0,90	93,22	,9212	100 + 60	,89639	—	49,04	145,53	3,51	68,71	,6791
11	,83783	—	8,99	108,01	0,98	92,58	,9149	61	,89718	—	49,85	146,31	3,54	68,35	,6755
12	,83960	—	9,81	108,76	1,05	91,95	,9087	62	,89795	—	50,67	147,09	3,58	67,98	,6719
13	,84133	—	10,62	109,50	1,12	91,32	,9025	63	,89871	—	51,49	147,87	3,62	67,62	,6683
14	,84302	—	11,44	110,25	1,19	90,70	,8964	64	,89947	—	52,30	148,65	3,65	67,27	,6648
100 + 15	,84467	—	12,26	111,00	1,26	90,09	,8903	100 + 65	,90021	—	53,12	149,44	3,68	66,92	,6613
16	,84629	—	13,08	111,75	1,33	89,48	,8843	66	,90095	—	53,94	150,22	3,72	66,57	,6579
17	,84788	—	13,89	112,50	1,39	88,88	,8784	67	,90169	—	54,76	151,00	3,76	66,22	,6545
18	,84944	—	14,71	113,26	1,45	88,29	,8726	68	,90242	—	55,57	151,78	3,79	65,88	,6511
19	,85097	—	15,53	114,01	1,52	87,71	,8668	69	,90314	—	56,39	152,56	3,83	65,55	,6478
100 + 20	,85248	—	16,34	114,77	1,57	87,13	,8611	100 + 70	,90385	—	57,21	153,34	3,87	65,21	,6445
21	,85397	—	17,16	115,52	1,64	86,56	,8555	71	,90454	—	58,03	154,13	3,90	64,88	,6412
22	,85543	—	17,98	116,28	1,70	86,00	,8499	72	,90522	—	58,84	154,91	3,93	64,55	,6379
23	,85686	—	18,80	117,03	1,77	85,45	,8444	73	,90590	—	59,66	155,70	3,96	64,23	,6347
24	,85827	—	19,61	117,79	1,82	84,90	,8390	74	,90657	—	60,48	156,48	4,00	63,91	,6315
100 + 25	,85966	—	20,43	118,55	1,88	84,35	,8336	100 + 75	,90723	—	61,29	157,27	4,02	63,59	,6284
26	,86102	—	21,25	119,31	1,94	83,81	,8283	76	,90788	—	62,11	158,05	4,06	63,27	,6253
27	,86235	—	22,07	120,07	2,00	83,28	,8231	77	,90853	—	62,93	158,84	4,09	62,96	,6222
28	,86367	—	22,88	120,83	2,05	82,76	,8179	78	,90917	—	63,75	159,62	4,13	62,65	,6191
29	,86496	—	23,70	121,59	2,11	82,24	,8128	79	,90980	—	64,56	160,41	4,15	62,34	,6161
100 + 30	,86622	—	24,52	122,36	2,16	81,73	,8077	100 + 80	,91046	—	65,38	161,19	4,19	62,04	,6131
31	,86748	—	25,33	123,12	2,21	81,22	,8027	81	,91103	—	66,20	161,98	4,22	61,74	,6101
32	,86872	—	26,15	123,89	2,26	80,72	,7977	82	,91163	—	67,02	162,77	4,25	61,44	,6071
33	,86993	—	26,97	124,65	2,32	80,23	,7928	83	,91223	—	67,83	163,55	4,28	61,14	,6042
34	,87112	—	27,79	125,42	2,37	79,74	,7880	84	,91282	—	68,65	164,34	4,31	60,85	,6013
100 + 35	,87228	—	28,60	126,18	2,42	79,25	,7832	100 + 85	,91340	—	69,47	165,13	4,34	60,56	,5985
36	,87341	—	29,42	126,95	2,47	78,77	,7784	86	,91398	—	70,28	165,92	4,36	60,27	,5956
37	,87452	—	30,24	127,72	2,52	78,29	,7737	87	,91455	—	71,10	166,71	4,39	59,99	,5928
38	,87562	—	31,06	128,49	2,57	77,82	,7691	88	,91511	—	71,92	167,49	4,43	59,70	,5900
39	,87670	—	31,87	129,26	2,61	77,36	,7645	89	,91567	—	72,74	168,28	4,46	59,42	,5872
100 + 40	,87776	—	32,69	130,04	2,65	76,90	,7600	100 + 90	,91622	—	73,55	169,07	4,48	59,15	,5845
41	,87884	—	33,51	130,81	2,70	76,45	,7555	91	,91677	—	74,37	169,86	4,51	58,87	,5818
42	,87990	—	34,32	131,57	2,75	76,00	,7511	92	,91731	—	75,19	170,65	4,54	58,60	,5791
43	,88095	—	35,14	132,34	2,80	75,56	,7467	93	,91785	—	76,00	171,44	4,56	58,33	,5764
44	,88199	—	35,96	133,11	2,85	75,12	,7424	94	,91838	—	76,82	172,22	4,60	58,06	,5738
100 + 45	,88301	—	36,78	133,88	2,90	74,69	,7381	100 + 95	,91891	—	77,64	173,01	4,63	57,80	,5712
46	,88400	—	37,59	134,65	2,94	74,26	,7339	96	,91942	—	78,45	173,79	4,66	57,54	,5686
47	,88498	—	38,41	135,43	2,98	73,84	,7297	97	,91993	—	79,26	174,58	4,68	57,28	,5661
48	,88594	—	39,23	136,20	3,03	73,42	,7256	98	,92043	—	80,08	175,37	4,71	57,02	,5635
49	,88688	—	40,04	136,98	3,06	73,01	,7215	99	,92093	—	80,90	176,16	4,74	56,76	,5610

TABLE II. HEAT 80°.

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 100	,92142	100	81,73	176,96	4,77	56,51	,5584
99	,92192	—	82,56	177,77	4,79	56,25	,5559
98	,92242	—	83,40	178,59	4,81	55,99	,5533
97	,92293	—	84,26	179,42	4,84	55,73	,5508
96	,92343	—	85,14	180,27	4,87	55,47	,5482
100 + 95	,92393	—	86,03	181,13	4,90	55,21	,5456
94	,92443	—	86,94	182,02	4,92	54,94	,5429
93	,92493	—	87,87	182,93	4,94	54,67	,5402
92	,92544	—	88,83	183,86	4,97	54,39	,5375
91	,92595	—	89,81	184,81	5,00	54,11	,5347
100 + 90	,92646	—	90,81	185,78	5,03	53,83	,5319
89	,92699	—	91,83	186,77	5,06	53,54	,5291
88	,92753	—	92,87	187,78	5,09	53,26	,5262
87	,92807	—	93,94	188,82	5,12	52,96	,5233
86	,92862	—	95,03	189,88	5,15	52,66	,5204
100 + 85	,92917	—	96,15	190,96	5,19	52,36	,5175
84	,92973	—	97,29	192,07	5,22	52,06	,5144
83	,93029	—	98,46	193,21	5,25	51,75	,5114
82	,93086	—	99,66	194,38	5,28	51,44	,5083
81	,93144	—	100,90	195,58	5,32	51,13	,5052
100 + 80	,93201	—	102,16	196,80	5,36	50,81	,5021
79	,93258	—	103,45	198,07	5,38	50,48	,4989
78	,93315	—	104,77	199,37	5,40	50,15	,4957
77	,93372	—	106,13	200,70	5,43	49,82	,4924
76	,93430	—	107,53	202,07	5,46	49,48	,4890
100 + 75	,93488	—	108,97	203,48	5,49	49,14	,4856
74	,93546	—	110,44	204,93	5,51	48,80	,4822
73	,93605	—	111,95	206,41	5,54	48,45	,4788
72	,93664	—	113,50	207,94	5,56	48,09	,4753
71	,93724	—	115,10	209,51	5,59	47,73	,4717
100 + 70	,93785	—	116,75	211,12	5,63	47,37	,4681
69	,93847	—	118,44	212,78	5,66	47,00	,4645
68	,93910	—	120,18	214,48	5,70	46,62	,4608
67	,93973	—	121,97	216,25	5,72	46,24	,4570
66	,94037	—	123,82	218,06	5,76	45,86	,4532
100 + 65	,94102	—	125,73	219,93	5,80	45,47	,4493
64	,94167	—	127,69	221,86	5,83	45,07	,4454
63	,94232	—	129,72	223,85	5,87	44,67	,4415
62	,94298	—	131,81	225,91	5,90	44,26	,4375
61	,94364	—	133,98	228,04	5,94	43,85	,4334
100 + 60	,94431	—	136,21	230,23	5,98	43,43	,4292
59	,94498	—	138,51	232,50	6,01	43,01	,4250
58	,94565	—	140,89	234,86	6,03	42,58	,4207
57	,94633	—	143,37	237,30	6,07	42,14	,4164
56	,94700	—	145,94	239,83	6,11	41,69	,4120
100 + 55	,94768	—	148,58	242,45	6,13	41,24	,4076
54	,94836	—	151,31	245,16	6,15	40,79	,4031
53	,94904	—	154,16	247,99	6,17	40,33	,3985
52	,94973	—	157,13	250,93	6,20	39,85	,3938
51	,95042	—	160,23	253,99	6,24	39,37	,3891

I. Water and spirit by weight.	II. Specific gravity.	III. Spirit by measure.	IV. Water by measure.	V. Bulk of mixture.	VI. Diminution of bulk.	VII. Quantity of spirit *per cent.*	VIII. Decimal multipliers.
W. + Sp.							
100 + 50	,95111	100	163,45	257,16	6,29	38,89	,3843
49	,95181	—	166,79	260,46	6,33	38,39	,3794
48	,95252	—	170,26	263,91	6,35	37,89	,3744
47	,95324	—	173,89	267,50	6,39	37,38	,3694
46	,95395	—	177,66	271,25	6,41	36,86	,3643
100 + 45	,95467	—	181,61	275,18	6,43	36,34	,3591
44	,95538	—	185,74	279,29	6,45	35,81	,3538
43	,95610	—	190,06	283,60	6,46	35,26	,3485
42	,95682	—	194,59	288,11	6,48	34,71	,3431
41	,95754	—	199,33	292,83	6,50	34,15	,3375
100 + 40	,95826	—	204,32	297,79	6,53	33,58	,3319
39	,95898	—	209,56	303,02	6,54	33,00	,3261
38	,95971	—	215,07	308,53	6,54	32,41	,3203
37	,96044	—	220,88	314,34	6,54	31,81	,3144
36	,96118	—	227,02	320,47	6,55	31,20	,3084
100 + 35	,96192	—	233,51	326,92	6,59	30,59	,3023
34	,96266	—	240,37	333,79	6,58	29,96	,2961
33	,96341	—	247,66	341,09	6,57	29,32	,2898
32	,96416	—	255,40	348,83	6,57	28,67	,2833
31	,96492	—	263,64	357,07	6,57	28,01	,2768
100 + 30	,96568	—	272,42	365,85	6,57	27,33	,2701
29	,96645	—	281,82	375,26	6,56	26,65	,2634
28	,96723	—	291,88	385,34	6,54	25,95	,2565
27	,96802	—	302,69	396,16	6,53	25,24	,2495
26	,96882	—	314,33	407,81	6,52	24,52	,2424
100 + 25	,96963	—	326,91	420,42	6,49	23,79	,2351
24	,97045	—	340,53	434,07	6,46	23,04	,2277
23	,97128	—	355,33	448,90	6,43	22,27	,2202
22	,97212	—	371,49	466,09	6,40	21,50	,2125
21	,97298	—	389,18	482,81	6,37	20,71	,2047
100 + 20	,97385	—	408,64	502,32	6,32	19,91	,1967
19	,97473	—	430,14	523,87	6,27	19,09	,1886
18	,97563	—	454,04	547,83	6,21	18,25	,1804
17	,97655	—	480,75	574,59	6,16	17,40	,1720
16	,97749	—	510,79	604,70	6,09	16,54	,1635
100 + 15	,97845	—	544,85	638,83	6,02	15,65	,1547
14	,97943	—	583,76	677,84	5,92	14,75	,1458
13	,98044	—	628,67	722,82	5,85	13,83	,1367
12	,98148	—	681,06	775,30	5,76	12,89	,1275
11	,98256	—	742,97	837,32	5,65	11,94	,1180
100 + 10	,98367	—	817,27	911,70	5,57	10,97	,1084
9	,98482	—	908,08	1002,64	5,44	9,97	,0986
8	,98602	—	1021,59	1116,26	5,33	8,96	,0885
7	,98727	—	1167,53	1262,32	5,21	7,92	,0783
6	,98856	—	1362,12	1457,03	5,09	6,86	,0678
100 + 5	,98991	—	1634,54	1729,58	4,96	5,78	,0571
4	,99131	—	2043,18	2138,36	4,82	4,68	,0462
3	,99278	—	2724,23	2819,54	4,69	3,55	,0350
2	,99432	—	4086,35	4181,79	4,56	2,39	,0236
1	,99592	—	8172,70	8268,20	4,44	1,21	,0120

Specific gravity of water at the different degrees of heat.

Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.	Heat.	Specific gravity.
°		°		°		°		°		°		°		°		°		°	
30	1,00074	35	1,00090	40	1,00094	45	1,00086	50	1,00068	55	1,00038	60	1,00000	65	,99950	70	,99894	75	,99830
31	1,00078	36	1,00092	41	1,00093	46	1,00083	51	1,00063	56	1,00031	61	,99991	66	,99939	71	,99882	76	,99816
32	1,00082	37	1,00093	42	1,00092	47	1,00080	52	1,00057	57	1,00024	62	,99981	67	,99928	72	,99869	77	,99802
33	1,00085	38	1,00094	43	1,00090	48	1,00076	53	1,00051	58	1,00016	63	,99971	68	,99917	73	,99856	78	,99788
34	1,00088	39	1,00094	44	1,00088	49	1,00072	54	1,00045	59	1,00008	64	,99961	69	,99906	74	,99843	79	,99774
																		80	,99759

Although the titles of the Columns in the preceding Tables, with what has been said in the introductory discourse, may render the Tables sufficiently obvious to the generality of readers, yet to some perhaps an example may be necessary; I shall therefore shew in what manner the quantity by measure of pure Spirit of ,825 specific gravity at 60° of heat, may readily be found by the help of these Tables.—In order to which, we must know the heat, the specific gravity, and quantity of spirit which the vessel contains.

EXAMPLE. Suppose the heat to be 35°, the specific gravity ,909, and the quantity of spirit 138,99 measures.

Under 35° of heat, and in Column II. of specific gravity, find ,909; and in the same horizontal line, take out from Column VIII, the decimal multiplier ,7297, by which multiply 138,99, cutting off as many figures to the right as there are decimals in both factors; then we shall have 101,421003 for the measures of pure spirit, of the specific gravity ,825 at 60° of heat.

Now a mere inspection of the Columns in the Tables will shew that a spirit of that strength was obtained, by adding 51 parts of water by weight to 100 parts of spirit, as in Column I. which produced the specific gravity found in the same horizontal line, Column II. It will as readily be seen, that the same specific gravity results from adding together their equivalents in measure, Columns III. and IV. and that Column V. contains the quantity, which the two quantities really measure after the mixture has been made.

ERRATA.

Page 281, column IV. line 34, *for* 126,12, *read* 125,12.
283, —— I. — 17, *for* 100 + 54, *read* 100 + 34.
Ibid. —— IV. — 34, *for* 126,05, *read* 125,05.
Ibid. —— V. — 2 from bottom, *for* 4886,96, *read* 4286,96.
285, —— VIII. — 23, *for* ,5046, *read* ,5056.
286, —— IV. — 8 from bottom, *for* 77,99, *read* 76,99.
287, —— VIII. — 23, *for* ,5044, *read* ,5054.
289, —— II. — 28, *for* ,95485, *read* ,95385.
290, —— IV. — 1 *dele* 0,84.

XXI. *Observations and Experiments on a Wax-like Substance, resembling the* Pé-la *of the* Chinese, *collected at* Madras *by Dr.* Anderson, *and called by him* White Lac. *By* George Pearson, *M. D. F. R. S.*

Read May 29, 1794.

1. *Some Observations relative to the natural History of the Insect which secretes a Sort of Wax, called white Lac.*

The matter which is the subject of the following observations and experiments, was first noticed by Dr. Anderson of Madras, about the year 1786, in a letter to the governor and council of that place, when he says, nests of insects resembling small cowry shells were brought to him from the woods by the natives, who eat them with avidity. These supposed nests he shortly afterwards discovered to be the coverings of the females of an undescribed species of coccus; and having noticed, in the Abbé Grosier's Account of China, that the Chinese collect a kind of wax, much esteemed by them, under the name of Pé-la, from a coccus deposited for the purpose of breeding on certain shrubs, and managed exactly in the same manner as the Mexicans manage the cochineal insect, he followed the same process with his new insects, and shortly found means to propagate them with great facility on several of the trees and shrubs growing in his neighbourhood.

On examining the substance, he observed in it a very considerable resemblance to bees wax; and noticed, moreover, that the animal which secretes it provides itself, by some means or other, with a small quantity of honey, resembling that produced by our bees; and he complains in one of his letters, that the children whom he employed to gather it were tempted by its sweetness to eat so much of what they collected, as to diminish materially the produce of his crop. It is also believed that the white lac possesses medicinal qualities.

A small quantity of this matter was sent to the President in 1789; but as there was not enough for the various experiments which suggested themselves to chemists who were consulted on the occasion, he wrote to Dr. ANDERSON for an additional quantity, who in 1792 furnished him with some pounds of it, both in its natural state, and melted into cakes, as also of the insects adhering to the branches on which they had been cultivated.

The curious analogy between the manner in which this insect produces its wax, and the mode in which it is produced by our bees, according to the late Mr. HUNTER's observation, and the singularity of the animal's producing honey as well as wax, were sufficient reasons, in point of abstract curiosity, to make an analysis very desirable; and moreover the probability of its becoming an object of commerce seemed apparent: for it certainly can be provided at Madras at a much less price than is given for wax, even in the cheapest markets. I therefore, at the request of the President, very willingly undertook the task of examining its chemical qualities, which are the subject of the following paper.

It must be remembered, that all the authors who describe

the true cochineal insect tell us, that the females when nearly perfect are covered thickly with a white down, or meal, which protects them from the sun and rain, and the attacks of certain insects who are their enemies. It is probable that this substance is of the same nature as the pé-la, and that the secretion of wax in more or less quantity is common to the genus of coccus. It is observable, moreover, that the insect which produces lac, a substance resembling wax, provides itself also with a sweet fluid resembling honey. Hence a striking analogy between these three animals is observable; and it is far from improbable that future naturalists may discover them to be species of the same genus; and find the means of making the beautiful red colour produced by the lac insect as useful in dying as that of the true cochineal.

II. *Sensible, and some other Properties of white Lac.*

A piece of white lac, which weighs from about three to fifteen grains, is probably produced by each insect. These pieces are of a grey colour, opaque, rough, and roundish; of about the size of a pea, but with a flat side, by which they adhere to the bark. In this flat side there is a fissure which contains a little black matter, the *exuviæ* of the insect.

White lac, in its dry state, has a saltish and bitterish taste, and in the mouth is soft and tough. It appears however from Mr. Anderson's letter, that the taste of this substance recently produced is "delicious;" so that it is difficult to prevent the children and other persons employed to gather it from eating it.

On pressing a piece of this substance between the fingers, a

watery liquid oozes out, which has a slight salt taste; and we are told that the recently gathered lac is replete with juice.

Although the roundish pieces of this substance yield to pressure between the fingers, they may be broken, and then appear to be perfectly white within, and of an uniform smooth texture. White lac has no smell, unless it be pressed or rubbed till it is soft, and then it emits a peculiar odour.

The lac which had been strained through muslin was of a brown colour throughout its whole substance; was brittle, hard, and had a bitterish taste, without any saltness, for its watery liquid had been separated by melting.

The pieces of lac gathered from the tree are as light, or lighter than bees wax; but after being melted and purified by straining, it sinks in water, and therefore is specifically heavier than bees wax generally is.

White lac melts in water of the temperature of 145° of FAHRENHEIT's thermometer. In boiling water it readily melted, and the black *exuviæ* were thus separated from the lac.

Two thousand grains of white lac were exposed in such a degree of caloric* as was just sufficient to melt them; as they grew soft and fluid, a pretty large quantity of reddish watery fluid, namely 550 grains, which emitted the smell of newly baked bread, oozed out. This liquid was poured off for examination, and the lac was strained through fine cloth repeatedly, till it left no *exuviæ* or other extraneous matter on the filter.

The quantity of purified lac thus obtained was 1290 grains.

* The names of the new system of chemistry are employed in this paper, for which it is presumed a particular explanation is unnecessary, as its nomenclature is now very generally used.

It was yellow like bees wax; hard and brittle as rosin. It had no bitterish or scarcely any other taste. It melted in alcohol, and also in water, of the temperature of between 145° and 146°.

Purified white lac adheres very firmly to wood, tin, paper, &c. so that it is an excellent cement on many occasions.

III. *Experiments to discover some of the Affinities and Combinations of white Lac.*

1. Yellow purified lac above mentioned was spread thin upon a plate of glass, and exposed to the rays of the sun during the whole of the month of July, 1793, but it was not by this means rendered at all less yellow.

2. A bit of white lac, on boiling in water with powdered charcoal, was absorbed, and disappeared.

3. Purified lac was digested in various proportions of ley of pure pot-ash, in different temperatures, but an uniform or soap-like mass could not be formed. The mixture emitted the smell of palm oil. The lac turned to a brown colour, and had the appearance of a coagulated mass, in the liquid as well as dry state. The liquid filtered from these solutions had a sweetish and bitterish taste. Upon the addition of vinegar, it became very turbid and rose-coloured; and by standing it let fall a copious sediment, which being dried was found to be white lac only rendered more brittle.

4. *Ammoniac*, or *caustic volatile alkali* seemed to combine with the white lac. The compound was a tolerably uniform brown soapy substance. It tasted sweet, and had still a weak smell of ammoniac. It rendered water milky, and this solution became curdy on adding to it acetous acid.

5. Candles, of different thicknesses, were made of purified white lac above mentioned, with cotton wicks of different thicknesses; and candles were also made of white lac which had been dissolved in sulphuric æther, and in volatile oil of turpentine. They all burned more rapidly, but I think emitted a less quantity of light, than wax candles, of the same size. The candles made of white lac also smoked and produced a rosinous smell.

White lac burned in oxygen gaz without affording any smoke, and with a beautifully bright flame.

A small piece of purified white lac, in a platina spoon, was exposed to the apex of the violet blue coloured flame of a candle, by means of the blow-pipe; a small quantity of black matter remained in the spoon, which could not be carried off by a long continued application of the flame; but after keeping the spoon red-hot in the fire for ten minutes, nothing but a very small quantity of grey ash was left.

6. From purified white lac nothing could be extracted by water; nor from the lac in its impure state, except a bitterish mucilage.

7. White lac turned to a black coloured substance by boiling it in concentrated sulphuric acid. The mixture was then diluted with water, and by means of the filter a carbonaceous matter was separated, which on being made red hot burnt in the air without flaming. The filtered liquid, upon evaporation to dryness, afforded no alkaline or other residue.

8. Glass covered with a thin coat of white lac was kept immersed in oxygenated muriatic acid gaz, and also in water saturated with this gaz, for several months, without producing any apparent change on the colour of the lac, or in its other properties.

9. On about 100 grains of white lac were poured 400 grains of concentrated nitrous acid. In a few minutes time the acid became of a deep orange colour, and, on making it hot, nitrous gaz was discharged, with an ebullition of the liquid. A fresh discharge of nitrous gaz took place on adding more nitrous acid. On applying caloric, to make the acid boil and to melt the lac, this substance was totally dissolved; but on standing to cool, it seemed to be wholly separated from the acid, and was rendered white. On diluting with water the acid from which the lac had separated itself, a very slight curdy precipitation took place; and the same appearance took place on adding ley of pot-ash. On evaporating this acid to dryness, a very small residue of lac was obtained. I dissolved a little of this substance by boiling it in concentrated nitrous acid, and poured the solution, while hot, into water; upon which a very copious precipitation instantly took place, of the lac rendered quite white.

10. One hundred grains of the substance under examination were totally dissolved, and very readily, in 500 grains of volatile oil of turpentine. While this solution was hot it was clear, but on cooling it grew opaque and white. On evaporation the whole of the lac was recovered.

11. Fifty grains of white lac readily dissolved in 500 grains measure of sulphuric æther, in the temperature of 80°. This solution was not unctuous, or resinous; the lower part of it was like an emulsion, and the upper part was transparent and limpid; but both parts contained the substance dissolved. Upon evaporation the lac was recovered in the form of a light white powder, which on melting became a brittle yellow solid, as heavy as before solution.

12. One hundred grains of white lac being digested in 1000 grains measure of alcohol, the specific gravity of which was as 835 to 1000, about half of the substance soon dissolved; and the solution when cold was opaque, white, and thick, as saturated solution of soap in hot spirit of wine appears on cooling. By repeated affusions of alcohol on the residue of these 100 grains, all but about 15 grains was dissolved; and this residue did not appear to be different from lac which had not been digested in this menstruum. This solution afforded, on evaporation, a light white opaque powder, which on being melted was a brittle, yellow, heavy solid, as the substance was before solution.

Saturated solution of white lac in alcohol spread upon paper, cloth, wood, &c. on evaporation left a thin coat of resinous matter, which was not however bright and smooth; and therefore this solution did not afford a good varnish.

IV. *Experiments to decompound white Lac by Fire.*

I shall only relate particularly one of these experiments, because among several which I made there was no material difference in the result.

Eight hundred grains of purified white lac were put into a glass retort, to which was affixed an adopter with a large bulb to receive condensed vapours, and the hydro-pneumatic apparatus to collect elastic fluids, or gazes. There distilled over 204 grains of yellow strongly empyreumatic oil of the consistence of butter, 400 grains of thin oil which had the smell of tar, near 20 grains of watery liquid containing a little acid, perhaps the pyrotartareous or the sebacic acid; besides 307

cubic inches of gaz. In the retort there remained 37 grains of carbonaceous matter, which was a pretty hard cinder, the under surface of which in contact with the glass had seemingly undergone a partial fusion, and the glass itself to which it adhered appeared to have been a little corroded.

The above distilled gaz contained no oxygen to the test of nitrous gaz; but 32 cubic inches of it were absorbed by milk of lime, and near 86 cubic inches of it were absorbed by yellow oxyd of lead, or massicot, placed in the focus of a lens; during which absorption lead was reduced, and water composed. The remainder of the gaz extinguished flame, and was concluded to be nitrogen or azotic gaz.

The gaz which was obtained by distillation was therefore a mixture of carbonic acid, hydrogen, and nitrogen gaz. This mixture burnt like what has been called heavy inflammable air.

The above 37 grains of carbonaceous matter afforded two grains of muriate of soda, one grain of carbonate of soda, four grains of phosphate of soda. The lixiviated carbonaceous matter being mixed with 300 grains of red oxyd of lead, and exposed to a due degree of fire, yielded about 60 cubic inches of carbonic acid gaz, and a little regulus of lead; but there was a residue of carbonaceous matter which could not be burnt away in the fiercest fire in open vessels. This residue was probably carbon, phosphoric acid, and soda, intimately mixed by fusion.

From this analysis, it appears that 100 parts of white lac purified yield

Butyraceous oil - - -	25½
Thin oil - - - - -	50
Water containing acid - - -	2½
Carbonaceous matter, containing phosphoric acid, muriatic acid, and soda - -	4½
Carbonic acid, by estimation - -	4
Hydrogen, by estimation - -	1½
Nitrogen or azote, by estimation - -	10
	98
Deficiency by waste and error, by estimation	2
	100 parts.

When this experiment was made with unpurified white lac, the proportion of water and carbonaceous matter was much greater than in the preceding experiment. On account also of the water, it was extremely difficult to prevent the substance boiling over and bursting the vessels.

Charcoal of wood being mixed with white lac, the oil seemed to distil over more readily, with less water, and was paler coloured oil than in the preceding experiment.

White lac was also distilled from pot-ash, without any material difference in the result, excepting that the oils which distilled over were thicker.

v. *Experiments upon the Liquid contained in white Lac.*

(*a*) On pressing, between the fingers, the pieces of white lac, in the state in which they are taken from the tree or shrub (although they are apparently quite dry and brittle, and have been kept several years), a watery liquid oozes out; by which paper stained with turnsole is instantly turned to a red colour.

(*b*) The 550 grains of reddish watery liquid above mentioned to have been separated from 2000 grains of white lac were filtrated through paper in order to separate mucilage.

(*aa*) This filtrated liquid has a slightly saltish taste, with bitterness, but is not at all sour.

(*bb*) When made hot, it smells precisely like newly baked hot bread.

(*cc*) On standing it grows somewhat turbid, and deposits a small quantity of sediment.

(*dd*) Its specific gravity in the temperature of 60° was to distilled water as 1025 to 1000.

(*ee*) A little of this liquid having been evaporated till it grew very turbid, on standing afforded small needle-like crystals in mucilaginous matter.

(*c*) About 250 grains of the liquid (*b*) were poured into a retort which held one ounce measure, to which was joined a receiver containing two shreds of paper, one stained with turnsole, and the other had been dipped in solution of sulphate of iron. As the liquor grew warm, mucilage-like clouds appeared, but when it grew hot they disappeared; and about the temperature of 200° it distilled over very fast. On distillation to nearly dryness, a small quantity of extractive matter remained.

The distilled liquid while hot smelt like newly baked bread, and was perfectly transparent and yellowish. The paper stained with turnsole was not reddened; nor was that which had been immersed in solution of sulphate of iron turned to a blue colour, upon moistening it with ley of pot-ash.

(*d*) The flame of a candle being applied by means of a blow-pipe to the extractive matter (*c*), the whole of it was burnt away, except what produced a black mark upon the spoon; in which no trace of alkali was detected by paper stained with turmeric.

(*e*) About 100 grains of the yellowish transparent liquid (*c*) being evaporated till it grew turbid, after being set by for a night, afforded acicular crystals; which under a lens appeared in a group, not unlike the umbel of parsley. The whole of these crystals could not, probably, have weighed a quarter of a grain. They tasted only bitterish.

(*f*) One hundred grains of the yellowish transparent liquid (*c*) being evaporated, in a very low temperature, to dryness, a blackish matter was left behind, which did not entirely disappear on heating the spoon containing it very hot in the naked fire; but on heating oxalic acid to a much less degree it evaporated, and left not a trace behind.

(*g*) *Carbonate of lime* (chalk) readily dissolved, with effervescence, in the liquid (*c*). The solution tasted bitterish, did not turn paper stained with turnsole to a red colour, and a copious precipitation ensued on adding to it carbonate of pot-ash (mild vegetable alkali). A little of this solution of lime, and also of alkali, being evaporated to dryness, and the residue being made red-hot, nothing remained but carbonate of lime, and carbonate of pot-ash.

(*b*) The above distilled liquid (*c*) did not render nitrate of lime turbid; but

(*i*) It produced turbidness in nitrate and muriate of baryt.

(*k*) To 500 grains of the reddish coloured liquid obtained by melting white lac, I added ley of carbonate of soda, till the effervescence ceased, and the mixture neither reddened paper stained with turnsole, nor turned paper stained with turmeric to a brown colour. The quantity of dry carbonate of soda used in the ley was three grains. A quantity of mucilaginous matter, with a little carbonate of lime, was precipitated during this combination. The saturated solution being filtrated and evaporated to a due degree, it afforded, on standing, deliquescent crystals.

(*l*) A little of the crystallized salt (*k*) by exposure to fire left only a residue of carbonate of soda.

(*m*) The reddish liquid obtained by melting the white lac being filtrated, the following precipitants were added; namely,

1. *Lime-water*, which produced a light purple, turbid appearance, and on standing, there were just perceivable clouds.

2. *Sulphuret of lime* (calcareous liver of sulphur) occasioned a white precipitation; but I could not perceive the smell of sulphurized hydrogen gaz, (hepatic air).

3. *Alcohol of gall nut* (tincture of gall nut) induced a grey precipitation.

4. *Sulphate of iron* (green vitriol) produced a purplish colour, but no precipitation; nor did any precipitation take place on adding to this mixture first a little vinegar, and then a little pot-ash.

5. *Acetite of lead* (sugar of lead) occasioned a reddish precipitation, which re-dissolved on adding a little nitrous acid.

6. *Nitrate of mercury* (solution of mercury in nitrous acid) produced a whitish turbid liquid.

7. *Oxalic acid* produced immediately a precipitation of white acicular crystals.

8. *Tartrite of pot-ash* (soluble tartar) being added, a precipitation took place which much resembled that which takes place on adding tartareous acid to tartrite of pot-ash; but the precipitated matter by the liquid from the white lac did not re-dissolve on adding pot-ash.

With respect to the nature of the liquid contained in white lac, it perhaps belongs to the genus of acids, because it changes turnsole to a red coloured substance, and neutralizes fixed alkali and lime (*g*) (*k*).

This acid liquid is most probably secreted at the same time with the white lac; and therefore the white lac coccus, like the ant, and some other insects, has organs for secreting an acid.

As this acid is destructible by fire (*f*) (*g*) (*l*), and as it affords carbon (*f*), it must be referred to the animal or vegetable acids.

From the precipitation of tartrite of pot-ash (*m*, 8) resembling tartar, this acid might be supposed to be the tartareous; but as this precipitate is not again dissolved on adding pot-ash; as it has no sour taste (*c*); as it evaporates in 200° of caloric (*b*); as the combination with lime is readily soluble in water, and decomposed by pot-ash (*g*) (*m*, 1); and as the combination with soda is a deliquescent salt (*k*), this acid cannot be considered to be the tartareous. Nor does this liquid appear, from the above experiments, to be any one of the other known vegetable or animal acids. The other proper-

ties, shown by the experiments, except the precipitation of tartrite of pot-ash, and the peculiar smell above mentioned, are either those common to every species of acid, or are possessed by several of them. For although this acid possesses several properties common to all acids, and some properties which belong to a few species only, there is not any one of the already known acids that has the smell, when heated, above mentioned; that precipitates tartrite of pot-ash, but does not serve to compose acidulous tartrite of pot-ash; that, besides having these properties, is vapour in the temperature of 200° without decomposition, has not a sour but a bitterish taste, and forms a soluble compound with lime, which is decomposable by pot-ash.

The precipitation by oxalic acid, it is probable, was occasioned by a small quantity of lime which the undistilled liquid of white lac contains.

The other phænomena in the experiments I do not refer to, because they are produced by acids in general.

Whether the above liquid from white lac be a new acid, or one of the acids already known, but disguised by mixture or union with other bodies, I leave to the decision of future experiments, and to the judgment of learned chemists.

VI. *Remarks and Conclusions from the preceding Observations and Experiments.*

1. White lac being unctuous when in a fluid state; having little or no smell and taste, unless heated; being insoluble in water; being inflammable in oxygen gaz; and decompounded by fire alone, in close vessels, before evaporation, it seems to

belong to the genus of *fat*, or *fixed oils*:—but it differs from them, and resembles the volatile oils and resins, in being brittle and semi-transparent; in being soluble in alcohol; in composing an imperfect soap with fixed alkalies; in dissolving readily in sulphuric æther.

2. As bees wax and white lac seemed to be alike in many properties, I extended the comparison by some experiments on bees wax.

Bees wax when first secreted is, I believe, always white, and it is often white when made into the comb. It remains white after being melted.

White lac becomes yellow, on purification by melting and straining.

Bees wax has a peculiar smell when cold. White lac has a smell only when made hot, and it is a different one from that of bees wax.

Bees wax is less brittle and hard than white lac. The former is, generally, specifically lighter than the latter; for bees wax often floated upon cold water, but purified lac fell to the bottom.

Bees wax melts at about 142°, and therefore in a few degrees less caloric than white lac.

Bees wax does not adhere so firmly to different bodies as white lac.

Yellow bees wax can be rendered white by exposure to the solar light, or by oxygenated muriatic acid, but this lac could not be bleached.

Bees wax formed a soap-like mass by union with pot-ash, which was soluble like common soap in water, but this lac afforded an imperfect soap.

It is well known that bees wax burns without affording almost any smoke or smell, and produces a steady light. I did not find that white lac, united with oil of olive, formed a wax little inferior to bees wax, which is said to be the case with the pé-la of the Chinese. By this union I made white lac whiter and as soft as bees wax; but it still afforded smoke, a resinous smell, and an unsteady light, as before.

Water extracted nothing from pure bees wax.

Nitrous acid, in the cold, only rendered it white; but, on boiling, the lac wholly dissolved, and like the white lac, on cooling, it separated, and was rendered white.

Oil of turpentine, and

Sulphuric æther formed compounds with bees wax similar to those with *white lac*. The solution of bees wax in sulphuric æther, on evaporation left a white powdery substance, which on melting was found to be common yellow wax.

Alcohol, the specific gravity of which to water was as 835 to 1000, dissolved bees wax with much more difficulty, and in much smaller proportion, than *white lac*. By digestion in this menstruum, of the temperature of 130° to 140°, it appeared that bees wax was totally soluble; but the same wax by repeated digestions became more and more difficultly soluble; and yet it did not appear that the last portion of wax was different in its other properties from wax which had not been digested.

On evaporation of this solution to dryness, a white substance in a powdery form remained, which being melted was yellow wax.

Bees wax, on decomposition by fire, in close vessels, with the hydro-pneumatic apparatus affixed, yielded resembling or nearly similar substances to those obtained on the analysis of

white lac by fire; for 1800 grains of bees wax gave 1200 grains of white butyraceous oil, with a little thin brown oil, and a very small quantity of water and acid; and a very large quantity of hydrogen and carbonic acid gaz, with which was probably mixed nitrogen gaz; but an accident prevented me determining the presence of this last gaz. In the retort there remained only about ten grains of carbonaceous matter. The smell of the empyreumatic oils was very different from those of white lac.

3. White lac appears to have the same kinds of affinity as bees wax; but many of their combinations are so very different in the two cases, as to determine white lac and bees wax to be different species of substances, although they agree with one another in more properties than they do with any other known bodies. As to the pé-la of the Chinese, we cannot judge of it unless a more particular account had been given of its qualities.

4. White lac and bees wax appear to be homogeneous substances, and to consist of the same kind of constituent parts, but the proportion of these parts is very different in the two substances; and hence the difference in the properties of bees wax and white lac. I consider the phosphate of lime, the soda, and muriate of soda, as extraneous to the composition of lac. The different composition of the two substances may enable us to explain in a probable manner the different action of other bodies upon them. For instance, as it appears that a much greater proportion of carbon enters into the composition of white lac than bees wax, the quantity of oxygen gaz in atmospheric air, applied under the usual circumstances of combustion, is not sufficient to combine with the

whole of the carbon and other components of a given part of white lac, wherefore a portion of carbon remains uncombined, in the form of soot, or a sublimate; but when oxygen gaz is applied, the whole of the carbon is combined with it, and of course no smoke appears.

The smaller proportion of carbon in bees wax than white lac, affords a probable reason why there is less smoke during the combustion of bees wax than white lac.

It appears reasonable to conclude, that white lac might be made to serve for illumination and combustion as well as bees wax, either by diminishing the proportion of carbon, or by increasing the proportion of the other components; but my knowledge of chemistry does not enable me to effect either of these changes.

XXII. *Account of some remarkable Caves in the Principality of* Bayreuth, *and of the fossil Bones found therein. Extracted from a Paper sent, with Specimens of the Bones, as a Present to the Royal Society, by his most Serene Highness the Margrave of* Anspach, *&c.*

Read January 10, 1793.

A RIDGE of primeval mountains runs almost through Germany, in a direction nearly from west to east; the Hartz, the mountains of Thuringia, the Fichtelberg in Franconia, are different parts of it, which in their farther extent constitute the Riesenberg, and join the Carpathian mountains; the highest parts of this ridge are granite, and are flanked by alluvial and stratified mountains, consisting chiefly of limestone, marl, and sandstone; such at least is the tract of hills in which the caves to be spoken of are situated, and over these hills the main road leads from Bayreuth to Erlang, or Nurenberg. Half way to this town lies Streitberg, where there is a post, and but three or four English miles distant from thence are the caves mentioned, near Gailenreuth and Klausstein, two small villages, insignificant in themselves, but become famous for the discoveries made in their neighbourhood.

The tract of hills is there broken off by many small and narrow vallies, confined mostly by steep and high rocks, here and there overhanging, and threatening, as it were, to fall

and crush all beneath; and every where thereabouts are to be met with objects, which suggest the idea of their being evident vestiges of some general and mighty catastrophe which happened in the primeval times of the globe.

The strata of these hills consist chiefly of limestone of various colour and texture, or of marl and sandstones. The tract of limestone hills abounds with petrifactions of various kinds.

The main entrance to the caves at Gailenreuth opens near the summit of a limestone hill towards the east. An arch, near seven feet high, leads into a kind of antichamber, 80 feet in length, and 300 feet in circumference, which constitutes the vestibule of four other caves. This antichamber is lofty and airy, but has no light except what enters by its open arch; its bottom is level, and covered with black mould; although the common soil of the environs is loam and marl.

By several circumstances it appears, that it has been made use of in turbulent times as a place of refuge.

From this vestibule, or *first cave*, a dark and narrow alley opens in the corner at the south end, and leads into the *second cave*, which is about 60 feet long, 18 high, and 40 broad. Its sides and roof are covered, in a wild and rough manner, with stalactites, columns of which are hanging from the roof, others rising from the bottom, meeting the first in many whimsical shapes.

The air of this cave, as well as of all the rest, is always cool, and has, even in the height of summer, been found below temperate. Caution is therefore necessary to its visitors; for it is remarkable, that people having spent any time in this or the other caverns, always on their coming out again appear

pale, which in part may be owing to the coolness of the air, and in part likewise to the particular exhalations within the caves. A very narrow, winding, and troublesome passage opens farther into a

Third cave, or chamber of a roundish form, and about 30 feet diameter, covered all over with stalactites. Very near its entrance there is a perpendicular descent of about 20 feet, into a dark and frightful abyss; a ladder must be brought to descend into it, and caution is necessary in using it, on account of the rough and slippery stalactites. When you are down, you enter into a gloomy cave of about 15 feet diameter, and 30 feet high, making properly but a segment of the third cave.

In the passage to this third cave, some teeth and fragments of bones are found; but coming down to the pit of the cave, you are every way surrounded by a vast heap of animal remains. The bottom of this cave is paved with a stalactical crust of near a foot in thickness; large and small fragments of all sorts of bones are scattered every where on the surface of the ground, or are easily drawn out of the mouldering rubbish. The very walls seem filled with various and innumerable teeth and broken bones. The stalactical covering of the uneven sides of the cave does not reach quite down to its bottom, whereby it plainly appears that this vast collection of animal rubbish, some time ago filled a higher space in the cave, before the bulk of it sunk by mouldering.

This place is in appearance very like a large quarry of sandstones; and indeed the largest and finest blocks of osteolithical concretes might be hewn out in any number, if there was but room enough to come to them, and to carry them

out. This bony rock has been dug into in different places, and every where undoubted proofs have been met with, that its bed, or this osteolithical stratum, extends every way far beneath and through the limestone rock, into which and through which these caverns have been made, so that the queries suggesting themselves about the astonishing numbers of animals buried here confound all speculation.

Along the sides of this third cavern there are some narrower openings, leading into different smaller chambers, of which it cannot be said how deep they go. In some of them, bones of smaller animals have been found, such as jaw-bones, vertebræ, and tibiæ, in large heaps. The bottom of this cave slopes toward a passage seven feet high, and about as wide, being the entrance to a

Fourth cave, 20 feet high, and 15 wide, lined all round with a stalactical crust, and gradually sloping to another steep descent, where the ladder is wanted a second time, and must be used with caution as before, in order to get into a cave 40 feet high, and about half as wide. In those deep and spacious hollows, worked out through the most solid mass of rock, you again perceive with astonishment, immense numbers of bony fragments of all kinds and sizes, sticking every where in the sides of the cave, or lying on the bottom. This cave also is surrounded by several smaller ones; in one of them rises a stalactite of uncommon bigness, being four feet high, and eight feet diameter, in the form of a truncated cone. In another of those side grottoes, a very neat stalactical pillar presents itself, five feet in height, and eight inches in diameter.

The bottom of all these grottoes is covered with true animal mould, out of which may be dug fragments of bones.

Besides the smaller hollows, spoken of before, round this fourth cave, a very narrow opening has been discovered in one of its corners. It is of very difficult access, as it can be entered only in a crawling posture. This dismal and dangerous passage leads into a *fifth cave*, of near 30 feet high, 43 long, and of unequal breadth. To the depth of six feet this cave has been dug, and nothing has been found but fragments of bones, and animal mould: the sides are finely decorated with stalactites of different forms and colours; but even this stalactical crust is filled with fragments of bones sticking in it, up to the very roof.

From this remarkable cave, another very low and narrow avenue leads into the last discovered, or the

Sixth cave, not very large, and merely covered with a stalactical crust, in which, however, here and there bones are seen sticking. And here ends this connected series of most remarkable osteolithical caverns, as far as they have been hitherto explored; many more may for what we know exist, hidden, in the same tract of hills.

Mr. ESPER has written a history in German of these caves; and given descriptions and plates of a great number of the fossil bones which have been found there. To this work we must refer for a more particular account of them.

XXIII. *Observations on the fossil Bones presented to the Royal Society by his most Serene Highness the Margrave of* Anspach, *&c. By the late* John Hunter, *Esq. F. R. S. Communicated by* Everard Home, *Esq. F. R. S.*

Read May 8, 1794.

The bones which are the subject of the present paper, are to be considered more in the light of incrustations than extraneous fossils, since their external surface has only acquired a covering of crystallized earth, and little or no change has taken place in their internal structure.

The earths with which bones are most commonly incrusted are the calcareous, argillaceous, and siliceous, but principally the calcareous; and this happens in two ways; one, the bones being immersed in water in which this earth is suspended; the other, water passing through masses of this earth, which it dissolves, and afterwards deposits upon bones which lie underneath.

Bones which are incrusted seem never to undergo this change in the earth, or under the water, where the soft parts were destroyed; while bones that are fossilized become so in the medium in which they were deposited* at the animal's death. The incrusted bones have been previously exposed to

* Bones that have been buried with the flesh on, acquire a stain which they never lose; and those which have been long immersed in water, receive a considerable tinge.

the open air; this is evidently the case with the bones at present under consideration, those of the rock of Gibraltar, and those found in Dalmatia; and from the account given by the Abbé SPALLANZANI, those of the island of Cerigo are under the same circumstances. They have the characters of exposed bones, and many of them are cracked in a number of places, particularly the cylindrical bones, similar to the effects of long exposure to the sun. This circumstance appears to distinguish them from fossilized bones, and gives us some information respecting their history.

If their numbers had corresponded with what we meet with of recent bones, we might have been led to some opinion of their mode of accumulation; but the quantity exceeds any thing we can form an idea of. In an inquiry into their history three questions naturally arise: did the animals come there and die? or were their bodies brought there, and lay exposed? or were the bones collected from different places? The first of these conjectures appears to me the most natural; but yet I am by no means convinced of its being the true one.

Bones of this description are found in very different situations, which makes their present state more difficultly accounted for. Those in Germany are found in caves. The coast of Dalmatia is said to be almost wholly formed of them, and we know that this is the case with a large portion of the rock of Gibraltar.

If none were found in caves, but in solid masses covered with marl or limestone, it would then give the idea of their having been brought together by some strange cause, as a convulsion in the earth, which threw these materials over them; but this we can hardly form an idea of; or if they had all been

found in caves, we should have imagined these caves were places of retreat for such animals, and had been so for some thousand years; and if the bones were those of carnivorous animals and herbivorous, we might have supposed that the carnivorous had brought in many animals of a smaller size which they caught for food; and this, upon the first view, appears to have been the case with those which are the subject of this paper; yet when we consider that the bones are principally of carnivorous animals, we are confined to the supposition of their being only places of retreat. If they had been brought together by any convulsion of the earth, they would have been mixed with the surrounding materials of the mountains, which does not appear to be the case; for although some are found sticking in the sides of the caves incrusted in calcareous matter, this seems to have arisen from their situation in the cave. Such accumulation would have made them coeval with the mountains themselves, which from the recent state of the bones I should very much doubt.

The difference in the state of the bones shows that there was probably a succession of them for a vast series of years; for if we consider the distance of time between the most perfect having been deposited, which we must suppose were the last, and the present time, we must consider it to be many thousand years; and if we calculate how long these must still remain to be as far decayed as some others are, it will require many thousand years, a sufficient time for a vast accumulation: from this mode of reasoning, therefore, it would appear that they were not brought here at once in a recent state.

The animal earth, as it is called, at the bottom of these caves, is supposed to be produced by the rotting of the flesh, which is supposing the animals brought there with the flesh on; but I do

conceive, that if the caves had been stuffed with whole animals, the flesh could not have produced one-tenth part of the earth, and to account for such a quantity as appears to be the produce of animals, I should suppose it the remains of the dung of animals who inhabited the caves, and the contents of the bowels of those they lived upon. This is easily conceived from knowing that there is something similar to it, in a smaller degree, in many caves in this kingdom, which are places of retreat for bats in the winter, and even in the summer, as they only go abroad in the evenings; these caves have their bottoms covered with animal earth, for some feet in depth, in all degrees of decomposition, the lowermost the most pure, and the uppermost but little changed, with all the intermediate degrees; in which caves are formed a vast number of stalactites, which might incrust the bones of those that die there.

The bones in the caves in Germany are so much the object of the curious, that the specimens are dispersed throughout Europe, which prevents a sufficient number coming into the hands of any one person to make him acquainted with the animals to which they belong.

From the history and figures given by ESPER, it appears that there are the bones of several animals; but what is curious, they all appear to have been carnivorous, which we should not have expected. There are teeth in number, kind, and mode of setting, exactly similar to the white bear, others more like those of the lion; but the representations of parts, however well executed, are hardly to be trusted to for the nicer characters, and much less so when the parts are mutilated.

The bones sent by his highness the Margrave of ANSPACH agree with those described and delineated by ESPER as belonging to the white bear; how far they are of the same species

among themselves, I cannot say; the heads differ in shape from each other; they are, upon the whole, much longer for their breadth than in any carnivorous animal I know of; they also differ from the present white bear, which, as far as I have seen, has a common proportional breadth; it is supposed, indeed, that the heads of the present white bear differ from one another, but the truth of this assertion I have not seen heads enough of that animal to determine.

The heads not only vary in shape, but also in size, for some of them, when compared with the recent white bear, would seem to have belonged to an animal twice its size, while some of the bones correspond in size with those of the white bear, and others are even smaller. *

There are two ossa humeri, rather of a less size than those of the recent white bear; a first vertebra, rather smaller; the teeth also vary considerably in size, yet they are all those of the same tribe; so that the variety among themselves is not less than between them and the recent. In the formation of the head, age makes a considerable difference; the skull of a young dog is much more rounded than an old one, the ridge leading back to the occiput, terminating in the two lateral ones, hardly exists in a young dog; and among the present bones there is the back part of such a head, yet it is larger than the head of the largest mastiff; how far the young white bear may vary from the old, similar to the young dog, I do not know, but it is very probable. Drawings of the different heads and ossa humeri, done in a very

* It is to be understood, that the bones of the white bear that I have, belonged to one that had been a show, and had not grown to the full or natural size; and I make allowance for this in my assertion, that the heads of those incrusted appear to belong to an animal twice the size of our white bear.

masterly manner by Mr. BATTY, surgeon in Great Marlborough-street, who was so obliging as to take that trouble, are annexed to this account. See Tab. XIX. and XX.

Bones of animals under circumstances so similar, although in different parts of the globe, one would have naturally supposed to consist chiefly of those of one class or order in every place, one principle acting in all places. In Gibraltar they are mostly of the ruminating tribe, of the hare kind, and the bones of birds; yet there are some of a small dog or fox, and likewise shells. Those in Dalmatia appear to be mostly of the ruminating tribe, yet I saw a part of the os hyoides of a horse; but those from Germany are mostly carnivorous. From these facts we should be inclined to suppose, that their accumulation did not arise from any instinctive mode of living, as the same mode could not suit both carnivorous and herbivorous animals.

In considering animals respecting their situation upon the globe, there are many which are peculiar to particular climates, and others that are less confined, as herrings, mackerel, and salmon; others again, which probably move over the whole extent of the sea, as the shark, porpus, and whale tribe; while many shell-fish must be confined to one spot. If the sea had not shifted its situation more than once, and was to leave the land in a very short time, then we could determine what the climate had formerly been by the extraneous fossils of the stationary animals, for those only would be found mixed with those of passage; but if the sea moves from one place to another slowly, then the remains of animals of different climates may be mixed, by those of one climate moving over those of another, dying, and being fossilized; but this I am afraid cannot be made out. By the fossils we may, however, have some idea

how the bones of the land animals fossilized may be disposed with respect to those of the sea.

If the sea should have occupied any space that never had been dry land prior to the sea's being there, the extraneous fossils can only be those of sea animals; but each part will have its particular kind of those that are stationary mixed with a few of the amphibia, and of sea birds, in those parts that were the skirts of the sea. I shall suppose that when the sea left this place it moved over land where both vegetables and land animals had existed, the bones of which will be fossilized, as also those of the sea animals; and if the sea continued long here, which there is reason to believe, then those mixed extraneous fossils will be covered with those of sea animals. Now if the sea should again move and abandon this situation, then we should find the land and sea fossils above mentioned disposed in this order; and as we begin to discover extraneous fossils in a contrary direction to their formation, we shall first find a stratum of those of animals peculiar to the sea, which were the last formed, and under it one of vegetables and land animals, which were there before they were covered by the sea, and among them those of the sea, and under this the common earth. Those peculiar to the sea will be in depth in proportion to the time of the sea's residence and other circumstances, as currents, tides, &c.

From a succession of such shiftings of the situation of the sea we may have a stratum of marine extraneous fossils, one of earth, mixed probably with vegetables and bones of land animals, a stratum of terrestrial extraneous fossils, then one of marine productions; but from the sea carrying its inhabitants along with it, wherever there are those of land animals there

will also be a mixture of marine ones; and from the sea commonly remaining thousands of years in nearly the same situation, we have marine fossils unmixed with any others.

All operations respecting the growth or decomposition of animal and vegetable substances go on more readily on the surface of the earth than in it; the air is most probably the great agent in decomposition and combination, and also a certain degree of heat. Thus the deeper we go into the earth, we find the fewer changes going on; and there is probably a certain depth where no change of any kind can possibly take place. The operation of vegetation will not go on at a certain depth, but at this very depth a decomposition can take place, for the seed dies, and in time decays; but at a still greater depth, the seed retains its life for ages, and when brought near enough to the surface for vegetation, it grows. Something similar to this takes place with respect to extraneous fossils; for although a piece of wood or bone is dead, when so situated as to be fossilized, yet they are sound and free from decomposition, and the depth, joined with the matter in which they are often found, as stone, clay, &c. preserves them from putrefaction, and their dissolution requires thousands of years to complete it; probably they may be under the same circumstances as in a vacuum; the heat in such situations is uniform, probably in common about 52° or 53°, and in the colder regions they are still longer preserved.

I believe it is generally understood that in extraneous fossils the animal part is destroyed; but I find that this is not the case in any I have met with.

Shells, and bones of fish, most probably have the least in quantity, having been longest in that state, otherwise they

should have the most; for the harder and more compact the earth, the better is the animal part preserved; which is an argument in proof of their having been the longest in a fossil state. From experiment and observation, the animal part is not allowed to putrefy, it appears only to be dissolved into a kind of mucus, and can be discovered by dissolving the earth in an acid; when a shell is treated in this way, the animal substance is not fibrous or laminated, as in the recent shell, but without tenacity, and can be washed off like wet dust; in some, however, it has a slight appearance of flakes.

In the shark's tooth, or glosso-petra, the enamel is composed of animal substance and calcareous earth, and is nearly in the same quantity as in the recent; but the central part of the tooth has its animal substance in the state of mucus interspersed in the calcareous matter.

In the fossil bones of sea animals, as the vertebræ of the whale, the animal part is in large quantity, and in two states; the one having some tenacity, but the other like wet dust: but in some of the harder bones it is more firm.

In the fossil bones of land animals, and those which inhabit the waters, as the sea-horse, otter, crocodile, and turtle, the animal part is in considerable quantity. In the stags horns dug up in Great Britain and Ireland, when the earth is dissolved, the animal part is in considerable quantity, and very firm. The same observations apply to the fossil bones of the elephant found in England, Siberia, and other parts of the globe; also those of the ox kind; but more particularly to their teeth, especially those from the lakes in America, in which the animal part has suffered very little; the inhabitants find little difference in the ivory of such tusks from the

recent, but its having a yellow stain; the cold may probably assist in their preservation.

The state of preservation will vary according to the substance in which they have been preserved; in peat and clay I think the most; however, there appears in general a species of dissolution; for the animal substance, although tolerably firm, in a heat a little above 100° becomes a thickish mucus, like dissolved gum, while a portion from the external surface is reduced to the state of wet dust.

In incrusted bones, the quantity of animal substance is very different in different bones. In those from Gibraltar there is very little; it in part retains its tenacity, and is transparent, but the superficial part dissolves into mucus.

Those from Dalmatia give similar results when examined in this way.

Those from Germany, especially the harder bones and teeth, seem to contain all the animal substance natural to them, they differ however among themselves in this respect.

The bones of land animals have their calcareous earth united with the phosphoric acid instead of the aerial, and I believe, retain it when fossilized, nearly in proportion to the quantity of animal matter they contain.

The mode by which I judge of this, is by the quantity of effervescence; when fossil bones are put into the muriatic acid it is not nearly so great as when a shell is put into it, but it is more in some, although not in all, than when a recent bone is treated in this way, and this I think diminishes in proportion to the quantity of animal substance they retain; as a proof of this, those fossil bones which contain a small portion of animal matter, produce in an acid the greatest effervescence when the

Fig. 1.

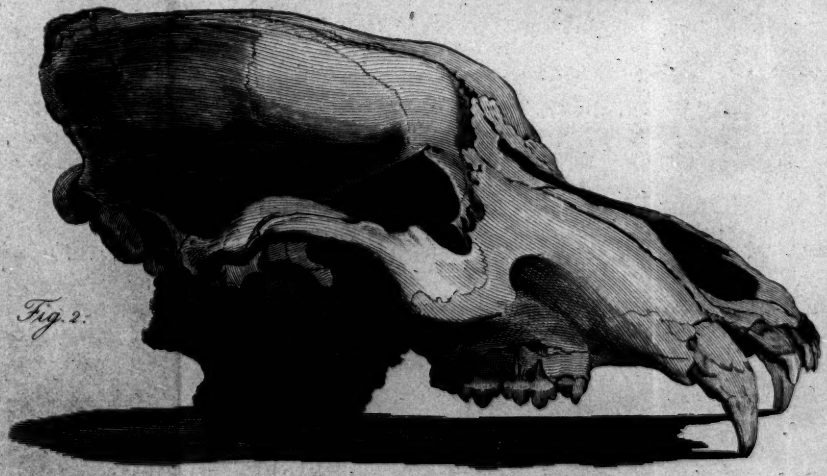


Fig. 2.

Fig. 1.

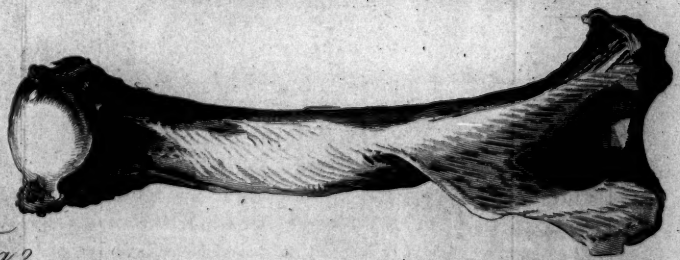
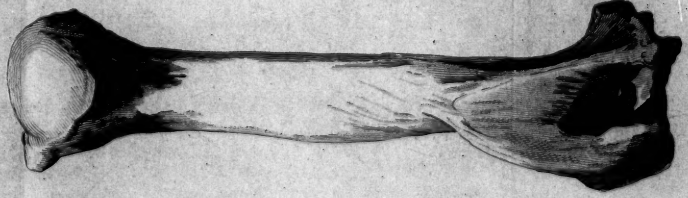


Fig. 2.



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surface is acted on, and very little when the centre is affected by it; however, this may be accounted for by the parts which have lost their phosphoric acid, and acquired the aerial, being easiest of solution in the marine acid, and therefore dissolved first, and the aerial acid let loose.

In some bones of the whale the effervescence is very great; in the Dalmatia and Gibraltar bones it is less; and in those the subject of the present paper it is very little, since they contain by much the largest proportion of animal substance.

EXPLANATION OF THE PLATES.

Tab. XIX.

Fig. 1. One of the incrusted skulls sent over by the Margrave of ANSPACH, which is much larger than that of the common white bear, longer for its breadth, and having a greater hollow between the anterior part of the skull and the bones of the face.

Fig. 2. Another skull, which differs in many respects from fig. 1. and nearly in the same degree that the first does from the skull of the recent white bear.

Tab. XX.

Fig. 1. A portion of a skull; to what animal it belongs is not exactly ascertained, unless it be the growing state of the bones in one of the varieties of the white bear species, but it is materially different from the full grown skulls expressed in Tab. XIX. It is rather too large in proportion to the others.

Fig. 2. Two of the incrusted ossa humeri, to shew that these bones vary very much among themselves, these two being in many respects dissimilar.

XXIV. *Account of a mineral Substance, called* Strontionite, *in which are exhibited its external, physical, and chemical Characters. By Mr.* John Godfrey Schmeisser, *F. R. S.*

Read May 29, 1794.

THIS substance has obtained its name from the place *Strontion*, in Scotland, where it is found in granite rocks, accompanied by galena and witherite, which latter is described by Dr. WITHERING in the Philosophical Transactions of the year 1784.

On all the specimens which I have seen of this substance, I could not discover any regular crystallized shape, like the witherite.

The specimen which I submitted to experiments, was in solid masses of a fibrous texture, apparently composed of long fibres, closely adhering to each other, and disposed in a radiated manner; its colour was an asparagus green, which appeared deeper towards the centre of the mass; when broken, the surface was a little shining in certain directions, the fragments rather bar-like, and somewhat brittle.

Some specimens exhibit only light shades of this colour, and appear to be composed of long thin bars, which are often separated from each other towards the extremity.

The specimen which I examined, and used for experiments, was semitransparent, but the most part of it rather inclining to opaque.

As to hardness, its surface could be scratched with a hard knife, but not scraped.

Its specific gravity I found as 3,586, compared to distilled water of 60° temperature.

Properties of the Substance.

N. B. The first experiments, which pointed out a distinction between its basis and the ponderous earth of SCHEELE, were made, at Dr. CRAWFORD's desire, by his assistant Mr. CRUIKSHANK, and were afterwards repeated by himself; the account of which is inserted in the second volume of the Medical Communications.

EXPERIMENT I.

I reduced a certain quantity of the substance to a very fine powder, and boiled it in water for some time, but no solution took place.

EXPERIMENT II.

With acids. It was not affected by sulphuric acid; but was entirely soluble in nitric and muriatic acid, with a strong effervescence, during which a great quantity of gaz was disengaged, which when tried, was entirely absorbed by lime-water, extinguished flame, and had no smell.

EXPERIMENT III.

Diluted sulphuric acid dropped into a diluted solution of this substance in nitric and marine acid, occasioned a white powdery precipitate, which was insoluble in water.

EXPERIMENT IV.

A piece of the substance was exposed to the action of the blow-pipe, did not crackle nor split asunder, nor did it melt when even exposed to white heat, but it discovered a very bright phosphorescent light, became more brittle, and had lost its greenish cast; it was then partly soluble in water.

It only lost a very little of its weight, when exposed for a long time to white heat, but it then still effervesces with acids.

EXPERIMENT V.

It melted with borax and soda with ebullition, but neither a blue nor a green colour was produced when melted with the first.

EXPERIMENT VI.

Liquid volatile alkali did not extract any blue colour from the powdered substance, nor when added to the solution in acids.

EXPERIMENT VII.

The solutions in nitric and muriatic acid were colourless, and a piece of paper dipped into this nitric solution burnt with a red flame, which was first observed by Dr. ASH.

EXPERIMENT VIII.

Phlogisticated alkali, or prussiate of pot-ash, added to a saturated solution, discovered a very slight quantity of blue precipitate.

EXPERIMENT IX.

Oxalic acid, or acid of sugar, added to the diluted solution, discovered a very slight precipitate.

EXPERIMENT X.

The remaining liquid of the foregoing experiment was mixed with sulphuric acid, until no more precipitate took place, the remaining filtered liquor was saturated with purified pot-ash, and no earth was separated or discovered.

EXPERIMENT XI.

A certain quantity of the powdered substance was dissolved, and saturated with nitric acid, and evaporated; it then crystallized; the crystals were permanent in air, did not deliquesce, and exhibited triangular and sexangular plates.

EXPERIMENT XII.

When dissolved and saturated with muriatic acid, it exhibited on evaporation long six-sided prismatic crystals, which have the broad alternating with the narrow sides, terminating in obtuse trihedral pyramids; this was observed by Dr. CRAWFORD, who also found *that the salt formed of the substance with acids dissolved in water, produced five times more cold than the salt from the barytes in the same acid; that the salt formed by marine acid and this substance, was much more soluble in warm water than in cold, whilst the muriat of barytes is nearly as soluble in cold as in warm water; that one ounce of distilled water dissolves three times as much of the muriat of Strontionite as the muriat of barytes, which makes a distinction between the basis of this substance and the barytes.*

EXPERIMENT XIII.

Nitric acid added to the solution of that substance in muriatic acid, occasioned a decomposition.

EXPERIMENT XIV.

A quantity of this substance was dissolved in muriatic acid, the solution much diluted with distilled water, and afterwards precipitated by diluted sulphuric acid. The precipitate was dried and decomposed by purified pot-ash, by means of heat.

The earth which was thus separated, was perfectly freed from saline parts, afterwards dried and calcined, in order to deprive it of moisture. A quantity of this earth was again dissolved in acid, in order to ascertain the quantity of carbonic acid, or fixed air, which it contained, and the real proportion of pure earth contained in a certain quantity.

I then found by accurate experiments,

1st. That 100 grains of specific sulphuric acid required 133 grains of the pure earth for saturation.

2dly. That 100 grains of nitric acid required 94 grains, and

3dly. That 100 grains of muriatic acid required 56 grains for saturation. Which experiment ascertained the dormant affinity of this earth to those acids.

I also ascertained in the same way,

1st. That 100 grains of sulphuric acid required 130 grains of barytes.

2dly. That 100 grains of nitric acid required 120 grains, and

3dly. That the same quantity of muriatic acid required 96 for saturation, which gave the dormant affinity betwixt the barytes and those acids.

From these experiments I drew the following conclusions.

1st. That according to experiment I. the substance contained no saline parts.

2dly. That according to experiment II. it contained fixed air.

3dly. That according to experiment III. it contained an earth somewhat similar to barytes.

4thly. That according to experiment IV. it discovers no crystallizing water.

5thly. That according to experiment V. the substance contained no cobalt.

6thly. That according to experiment VI. the substance contained no copper.

7thly. That according to experiment VIII. it contained a little iron.

8thly. That according to experiment IX. the substance contained calcareous earth.

9thly. That according to experiment X. the substance contained no argillaceous nor magnesian earth.

10thly. That according to the last experiment, the base of this substance is distinct from the barytes.

In order to ascertain the quantity or proportion of component parts of this substance,

EXPERIMENT I.

One hundred grains were dissolved in acid, and yielded 30 grains of fixed air.

EXPERIMENT II.

The solution was diluted, and mixed with oxalic acid, by means of which half a grain of calcareous earth was separated (in the state of oxalate of lime).

EXPERIMENT III.

The remaining solution was decomposed, and yielded 68 grains of pure earth.

According to these experiments, 100 grains of the analyzed substance contains 30 grains of fixed air, 1 of calcareous, and 68 grains of another earth, which may be called *Strontion earth*, and the remaining weight may be accounted for, from the substance which gives it the colour, and which I suggest, from comparative experiments, to be phosphate of iron and manganese; the proportion of which I could not accurately ascertain, on account of the smallness of the specimen which I possessed, and which I employed for analysis; but which I shall endeavour to ascertain by future experiments on a larger scale.

In order to compare the nature of the substance with which it was accompanied to the before-mentioned substance, I made the following experiments.

This substance was crystallized in six-sided prisms with pyramids, colourless, semitransparent, rather opaque towards the basis, and less hard than the other substance; a certain quantity of it I reduced to fine powder, and submitted it to various experiments, by which I found that it contained barytes, calcareous earth, and carbonic acid.

One hundred grains of this substance were dissolved in marine acid, during which 15 grains of carbonic acid were separated; the solution was gently evaporated, and exposed to crystallize. The crystals were then exposed for some time to air in a funnel, during which part of the crystals had deliquesced. When no more deliquescence was observed, the whole liquor was diluted with a sufficient quantity of distilled water, and diluted sulphuric acid was then added, by means of which 2 grains of barytes were separated. The filtered liquor was then decomposed by alkali, and 12 grains of calcareous earth were separated. The dry crystals remaining on the

funnel were then dissolved in distilled water, and also decomposed by alkali, by means of which 68 grains of barytes were obtained.

According to these experiments, 100 grains of this crystallized substance yielded by decomposition 70 grains of barytes, 15 grains of carbonic acid, and 12 grains of calcareous earth. The difference of the 3 remaining grains may be accounted for by the water, by the small loss which was observed when the crystallized substance was exposed to a strong heat, and also from the crackling which was perceived when exposed to a sudden heat. Whether this crystallized substance is different from that specimen which Dr. WITHERING analyzed, or whether the calcareous earth escaped his observation during his experiments, I cannot decide, as he does not mention that he employed the substance in a crystallized state for his experiments.*

* The experiments newly communicated by Mr. KIRWAN, and those which are promised to be communicated by Dr. HOPE, will probably throw some more light on the nature of the Strontionite.

XXV. *Account of a spontaneous Inflammation. By* Isaac Humfries, *Esq. In a Letter from* Thomas B. Woodman, *Esq. to* George Atwood, *Esq. F. R. S.*

Read July 10, 1794.

DEAR SIR, Ewell, June 9, 1794.

I INCLOSE you the extract of the letter from ISAAC HUMFRIES, Esq. a gentleman resident in India, and employed in the Company's service, which relates to the circumstance of the fire I lately mentioned to you.

And am yours, &c.

THOMAS B. WOODMAN.

"ON going into the arsenal a few mornings since, I found my friend Mr. GOLDING, the commissary of stores, under the greatest uneasiness in consequence of an accident which had happened the preceding night. A bottle of linseed oil had been left on a table, close to which a chest stood, which contained some coarse cotton cloth; in the course of the night the bottle of oil was thrown down, and broken on the chest (by rats most probably), and part of the oil ran into the chest, and on the cloth: when the chest was opened in the morning,

the cloth was found in a very strong degree of heat, and partly reduced to tinder, and the wood of the box discoloured, as from burning. After a most minute examination, no appearance of any other inflammable substance could be found, and how the cloth could have been reduced to the condition in which it was found, no one could even conjecture. The idea which occurred, and which made Mr. GOLDING so uneasy, was that of an attempt to burn the arsenal. Thus matters were when I joined him, and when he told me the story and shewed me the remainder of the cloth. It luckily happened that in some chemical amusements, I had occasion to consult HOPSON's book a very few days before, and met with this particular passage, which I read with a determination to pursue the experiment at some future period, but had neglected to do so. The moment I saw the cloth, the similarity of circumstances struck me so forcibly, that I sent for the book and shewed it to Mr. GOLDING, who agreed with me that it appeared sufficient to account for the accident. However, to convince ourselves, we took a piece of the same kind of cloth, wetted it with linseed oil, and put it into a box, which was locked and carried to his quarters. In about three hours the box began to smoke, when on opening it, the cloth was found exactly in the same condition as that which had given us so much uneasiness in the morning, and on opening the cloth, and admitting the external air, it burst into fire. This was sufficiently convincing; however, to make it more certain, the experiment was three times tried, and with the same success."

P. S. The passage Mr. HUMFRIES alludes to is in page 629 of HOPSON's Chemistry, where, in a note, you will find mention

made of a set of chemical experiments made on inflammable substances by a Mr. GIORGI of the Imperial Academy of Petersburgh, in consequence of the burning of a Russian frigate at Cronstadt in 1781, although no fire had been made on board of her for five days before.

XXVI. *An Account of an Appearance of Light, like a Star, seen in the dark Part of the Moon, on Friday the 7th of March, 1794, by* William Wilkins, *Esq. at* Norwich. *In Extracts of a Letter to the Rev.* Samuel Vince, *F. R. S. and of three Letters to the Rev.* Nevil Maskelyne, *D. D. F. R. S. and Astronomer Royal; and communicated by the latter.*

Read July 10, 1794.

LETTER I.

REVEREND SIR, Norwich, 17th April, 1794.

I RECEIVED your letter yesterday; and I am extremely happy in giving you the best description in my power respecting the phænomenon I saw in the moon, on Friday the 7th of March, a few minutes before eight o'clock in the evening. I was in hopes, as it was a bright evening, that some astronomer might observe it, who would have described it in a more *scientific* manner than I can. The few observations I made were merely to compare with some account I expected and wished to meet in some periodical publication.

My friend Mr. BECKWITH having the day before told me that I might see Mercury soon after sun-set, I had been looking for that planet from the Castle-hill in Norwich, but was disappointed by a clouded horizon. I mention this merely as the reason of my being led to a more particular notice of the moon also in this evening, having lost the first object of that evening's attention.

When I saw the light speck, as shewn in the sketch, (see Tab. XXI. fig. 1.) I was very much surprised; for, at the instant of discovery I believed a star was passing over the moon, which on the next moment's consideration I knew to be impossible. I remembered having seen, at some periods of the moon, detached lights from the serrated edge of light, through a telescope; but this spot was considerably too far distant from the enlightened part of the moon; besides, this was seen with the naked eye. I was, as it were, rivetted to the spot where I stood, during the time it continued, and took every method I could imagine to convince myself that it was not an error of sight; and two persons, strangers, passed me at the same time, whom I requested to look, and they (may be, a little more ignorant than myself) said it was a star. I am confident I saw it five minutes at least; but as the time is only conjectural, it might not, possibly, be so long.

The spot appeared rather brighter than any other enlightened part of the moon. IT WAS THERE WHEN I FIRST LOOKED. The whole time I saw it, it was a FIXED, STEADY LIGHT, except the moment before it disappeared, when its brightness INCREASED; but that appearance was instantaneous.

I have a reflecting telescope, and as I was very near home, I had determined to return and use it on this occasion; for it was so fixed, I had scarcely a doubt but its appearance would continue; but almost at the instant, and whilst I was looking, it totally disappeared. You can tell, by the age of the moon at that time, the apparent breadth of light upon the surface of that body, which, as near as I can judge, determines the distance of the spot from two points, B and C, on the periphery of the circle, (see fig. 1.) in which A is the enlightened spot; B A = A D = D C; B A D is supposed a right angle.

I mentioned this soon afterwards to a gentleman of my acquaintance, who sometimes amuses himself in the study of astronomy; he was extremely inquisitive about it, and conjectured this phænomenon to be some great volcanic convulsion in the moon, which induced me at that time to assist my memory with a sketch like what I have here sent you. I shall be obliged to you, Sir, if you will favour me with Dr. MASKELYNE's opinion, if what I have related is sufficient ground for him to form an opinion upon; and whether any such phænomenon has ever before been observed. When I was lately in town, I mentioned the particulars to my worthy friend Mr. H. REPTON, and if my engagements would have permitted, he was desirous I should call with him upon Dr. HERSCHEL, with whom he has some acquaintance.

I am, &c.

WILLIAM WILKINS.

Norwich,
17th April, 1794.

To the Rev. SAMUEL VINCE.

LETTER II.

REVEREND SIR, Norwich, 2d May, 1794.

I am favoured with your letter of the 1st instant, respecting the description of the light spot observed by me in the moon.

I am certain as to the evening I saw the phænomenon, because I made the memorandum in a pocket journal I keep; besides, another local circumstance convinces me of its being on a Friday, and not on any other day than the 7th of March.

You are undoubtedly right in supposing I had forgot how near the moon was to a half moon; and when I wrote to Mr. VINCE, I answered him in haste; for his letter to me requested

an immediate answer, on account of his engagement to leave Cambridge in a short time. If you will please to refer to my letter, I think you will find I was somehow aware of my not describing the age of the moon properly in the sketch; for I said, "*you will be able to tell* by the age of the moon at that "time, *the apparent breadth of light*, which may, in some mea-"sure, determine the situation of the spot according to my "idea."

The sketch I made at first was in pencil, without the assistance of compasses.

It appeared like a small star, without changing its form or situation; and its distance was as far from the enlightened edge D as from the dark edge B.

I am, &c.

WILLIAM WILKINS.

To the Rev. Dr. MASKELYNE.

LETTER III.

REVEREND SIR, Norwich, 8th May, 1794.

I am again favoured with yours of the 6th instant. The evening I saw the bright spot on the moon, I had been looking for Mercury soon after sun-set, and walked more than an hour; and having been disappointed by a clouded horizon, I returned home (my house is within 50 yards of the Castle-hill); and after staying some time, set out again to the coffee-house to look at the papers, as I usually do about that time, *i. e.* eight o'clock. I took the Castle-hill again in my way, when I was surprised with the appearance I have already described. After the disappearance of the phænomenon, I was very

particular in my inquiries respecting the time, and called purposely on a neighbour* to ascertain it with certainty; and found it a few minutes before eight o'clock, which time I entered in my pocket journal; and on inquiry of Mrs. WILKINS, she says I left home at that time.

I am in my 44th year, and have a strong, good sight, not in the least short sighted. About two years since, I purchased a pair of spectacles in town, because I did not, in pointing a pen, see the nib so distinctly as formerly; but notwithstanding, they lay in my drawer totally useless.

My profession has lately carried me frequently to Orfordness, where I have been constructing a lighthouse for Lord HOWARD, upon the new principle, with ARGAND lamps and reflectors; and the goodness of my sight has often been remarked, in discovering vessels with the *naked eye*, which my companions could not discover but with the telescope. I find that by looking some time at an object, my left eye waters, I suppose from weakness; but if I shut it, my other eye still remains strong sighted. When the moon is young, I do perfectly see the whole circumference, from the faint light which surrounds it; and on that evening the moon appeared a well defined crescent.

I remember seeing the star you mention that evening; but I think it was between nine and ten o'clock that I observed it; and it was in appearance, may be, two of the moon's diameters distance to the west; but I did not particularly notice it.

I am very certain of this spot appearing WITHIN the circumference of the moon's circle.

I am, &c. WILLIAM WILKINS.

Castle Meadow.

To the Rev. Dr. MASKELYNE.

* Mr. R. BACON, who is publisher of one of the Norwich papers.

LETTER IV.

SIR, Hare-street, by Romford, 26th May, 1794.

Having been some days from Norwich, I received your favour of the 23d instant only this morning. The clocks at Norwich are regulated by mean time, in the same manner as in London. I have herewith given the figure you request, copying the moon's appearance from your scheme, not having any of my former sketches with me (see fig. 2.); I have placed the spot of light to the best of my recollection; and I hope it is such as will be the means of satisfying your curious inquiries.

I am, &c.

WILLIAM WILKINS.

To the Rev. Dr. MASKELYNE.

XXVII. *An Account of an Appearance of Light, like a Star, seen lately in the dark Part of the Moon, by* Thomas Stretton, *in St.* John's Square, Clerkenwell, London; *with Remarks upon this Observation, and Mr.* Wilkins's. *Drawn up, and communicated by the Rev.* Nevil Maskelyne, *D. D. F. R. S. and Astronomer Royal.*

Read July 10, 1794.

Mr. Vince, Fellow of this Society, having acquainted me by letter, early in April last, that a gentleman at Norwich had a month before seen a bright spot upon the dark part of the moon, and had made a little drawing of it in his pocket-book, which he promised to send to him, I immediately wrote a letter in answer to Mr. Vince, to desire him to request the gentleman to send the drawing he had promised, and a full account of the phænomenon. Mr. Vince accordingly wrote to the gentleman immediately, Mr. William Wilkins, architect at Norwich, which produced the first of the foregoing letters, and addressed by Mr. Wilkins to him, giving a particular account of his observation, with a drawing of the appearance.

Soon after, my relation Sir George Booth, Bart. with his lady, being on a visit at the Royal Observatory, upon my mentioning Mr. Wilkins's observation, Lady Booth said their servant, who is curious for a person in his situation, and fond of looking at the stars, had some time before seen something

extraordinary in the moon. Upon this I took occasion, on the 28th of April, to question the man about it, taking care at the same time to direct my inquiries so as to give him no hint of what had been seen by Mr. WILKINS. I immediately minuted down the information he gave me, which was as follows. "Some time ago, about six in the evening, the moon "not being a quarter old, he saw a light like a star, and as "large as a middle sized star, but not so bright, in the dark "part of the moon. He continued looking at it for a minute "or more, during which time it kept the same light, and he "then lost sight of it by going into the house. He said he "thought it was not the present moon, viz. that which is now "almost gone, and that it was not above seven weeks ago. "He was not, however, certain whether it was three weeks or "seven weeks ago." I made a drawing of the moon before him, and desired him to direct me about forming the size of the crescent, and laying down the place of the star-like appearance in the dark part of the moon, which sketch I have subjoined to this account. (See Tab. XXI. fig. 3.)

Lady BOOTH thought the time of the night, when he saw this appearance, was later, and rather seven o'clock, for he mentioned it to her immediately after. Not doubting but this phænomenon, seen by THOMAS STRETTON, in St. John's Square, was the same as was seen by Mr. WILKINS at Norwich, and on the same night, I wished to ascertain the time more nearly by some local circumstances, depending on the place from which the phænomenon was seen, and the tops of the houses or chimnies over which it appeared. Accordingly, on the 21st of May, I desired THOMAS STRETTON to stand in the same place he did when he saw the appearance, and point

out to me the place of the sky where he had seen the moon, with respect to the opposite house and chimnies over which she appeared. With the help of a pocket compass and small wooden quadrant, I found the bearing of the place of the sky, which he pointed out to me, to be 80° west of the magnetic south, or 56° west of the true south meridian, and the altitude 34°. Taking the moon's right ascension from the nautical almanac for the 7th of March, the day stated by Mr. WILKINS, with the bearing abovementioned, and latitude of St. John's Square taken 51° 31′, I find the observation must have been made exactly at eight o'clock mean time, provided the bearing could be exactly depended upon; but as an uncertainty of a few degrees may be allowed therein, we may conclude that the observation was not far from eight o'clock. This agrees nearly with the time of Mr. WILKINS's observation, for he seems to have lost sight of the star on the dark part of the moon a little before eight o'clock, mean time, at Norwich, the correspondent time to which in St. John's Square, on account of the difference of meridians, would be five minutes sooner. An error only of ten minutes in the time noted by Mr. WILKINS, and that deduced from the bearing observed in St. John's Square, both taken together, will bring the observation in St. John's Square to precede the time of the disappearance of the star-like appearance at Norwich: and therefore the two observations agree as nearly together as can be expected from the circumstances in which the observers were placed, and the two observations mutually confirm each other. The altitude of the moon at eight o'clock, by computation, is 41°, or 7° higher than that taken with the quadrant; which difference may be allowed for the error such

an estimation is liable to, and affords no ground for argument against the observations belonging to the same phænomenon, and consequently is an additional confirmation of it.

In order to ascertain the time, and other circumstances relating to the phænomenon, I made some inquiries of Mr. WILKINS, by several letters, which he answered with much candour and exactness, as appears by the extracts of his answers prefixed to this account.

Mr. VINCE, in his letter to me, giving me the first notice of this phænomenon, observed that Mr. WILKINS is an eminent builder, a sensible man, and by no means likely to be deceived; and adds, that the length of time during which he saw it, seems to preclude the possibility of any deception. Mr. WILKINS himself relates that he is long sighted, and that he distinguishes very well the dark part of the moon, illuminated by a faint light, while she is young, which completes her circle. The other person, THOMAS STRETTON, is a young man of sobriety and steadiness, and long sighted also. I particularly mention these circumstances, to obviate an objection that has been made to these accounts, from the circumstance of the bright star in the south eye of the bull, called Aldebaran, having passed by the moon the same evening, and been eclipsed by the northern part of her disk. I own it is a singular coincidence of circumstances, that Aldebaran should the same evening pass behind the moon, in nearly the same track in which this star-like appearance was observed upon the dark part of the moon's disc: but the two facts, considered as independent of each other, are not incompatible. The appulse of Aldebaran to, and subsequent occultation by the moon's disc, was predicted in the nautical almanac, and observed by many.

I observed its eclipse at the moon's dark limb at $6^h\ 47'\ 30''$, and its emersion from the moon's bright limb, at $7^h\ 30'\ 3''$ mean time, at Greenwich.*

The appearance of the spot of light upon the moon's dark part, and its subsequent sudden disappearance at Norwich, happened near eight o'clock; and the observation of the star upon the moon at St. John's Square happened about the same time. I would then ask the persons who make the objection, how could two persons, at two distant places, see a star appear upon the dark part of the moon, at a considerable distance within its circumference, while it was really off it, especially as they were both long sighted? and particularly, how could the immersion be observed near eight o'clock, which really happened at 54 minutes past six, or above an hour before? If it be supposed that the persons saw Aldebaran after its emersion from the moon's bright limb, that is, after half past seven, it becomes still more difficult to conceive, that a star, really on the bright side of the moon, should, by some illusion or optic fallacy, cross that bright part to appear upon the dark part; besides, this supposition does not account for the sudden disappearance of the star.

Mr. VINCE has lately informed me, that he had seen and conversed with Mr. WILKINS on the subject; who expressed himself to be certain both of the time, and place on the dark part of the moon's disc, where he saw the star-like appearance within the circumference.

* The immersion at Norwich, on account of the difference of parallax, would happen about a minute and an half later, and the emersion as much sooner; and considering also the difference of meridians, by which Norwich is five minutes of time to the east of Greenwich, the immersion at Norwich must have happened at $6^h\ 54'$, and the emersion at $7^h\ 33'$ mean time.

I shall make no conjectures on the cause to which this extraordinary phænomenon may be attributed; but only remark, that it is probably of the same nature with that of the light seen of late years in the dark part of the moon by our ingenious and indefatigable astronomer, Dr. HERSCHEL, with his powerful telescopes, and formerly by the celebrated DOMINIC CASSINI; although this has been so illustrious as to have been visible to the naked eye, and probably equal in appearance to a star of the third magnitude.

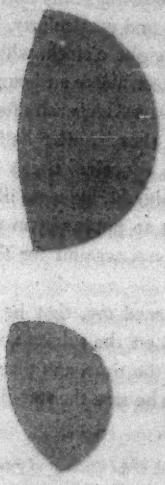


Fig. 1.

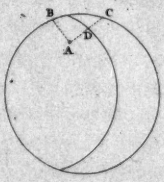


Fig. 2.

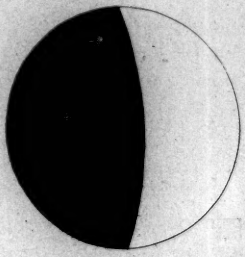
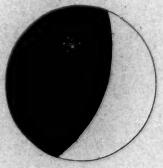


Fig. 3.



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21.	Descriptio et adumbratio microscopico-analytica Muscorum frondosorum novorum dubiisque vexatorum, auctore J. Hedwig, Vol. 3um. Lipsiæ, 1792. fol.	Professor Hedwig, F. R. S.
	Eclipsis Solis annularis fere centralis Varsaviæ, A. 1793, die 5 Sept. Mscr. fol. pat.	M. Bystrzycki, Astronomer to the King of Poland.
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1794.		
Jan. 9.	Commentarii de Rebus in Scientia naturali et Medicina gestis, Volumen XXXIV. et Decadis tertiæ Index. Lipsiæ, 1792-3. 8°	Mr. Philip Hurlock, F. R. S.
	The Life of Thomas Ruddiman, by G. Chalmers. London, 1794. 8°	George Chalmers, Esq. F. R. S.
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13.	Some Considerations concerning public Roads. London, 1734. 8°	
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	Mémoires de l'Académie Royale des Sciences et Belles Lettres, 1788 et 1789. Berlin, 1793. 4°	Comte de Hertzberg, F. R. S.
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From the Press of
W. BULMER & Co.
Cleveland-Row, St. James's.